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Steel in Reinforced Concrete Work

More and More Reinforcing Bars Absorbed in Construction—Rail Steel Bars and Steel Mesh —Total Over 1,000,000 Tons

BY HOWARD J. CARSWELL

A Veritable Network of Steel Was Needed to Reinforce the Concrete in the Camden Anchorage of the Great Suspension Bridge Being Constructed Over the Delaware River at Philadelphia

MORE than a million tons of steel for reinforced concrete construction used annually indicates in a definite measure the indispensability of "armored concrete" in our twentieth-century building advancement. Since the adoption of reinforcement for concrete about thirty years ago, the use of steel in this type of construction has shown consistent increases. As a consequence, concrete builders are now among the good customers of the steel industry.

According to reports of the American Iron and Steel Institute, during 1924 there were employed about 740,000 tons of steel bars in concrete construction. This figure excludes the widespread use of I-beams, channels, angles and sundry steel forms applied in strengthening concrete construction. Neither does this amount include the great quantity of steel bars sold for miscellaneous purposes, but which eventually find their way into concrete construction, nor the 100,000 tons of steel mesh employed in strengthening roads and floors. With these additions it is probable that the usage of steel in the United States last year exceeded a million tons and perhaps approached one and a half million tons.

More than this record amount of steel may probably be used in 1925, according to estimates based upon cement shipments, as reported by the United States Bureau of Mines, foretelling a greater market for cement this year than ever before. As a good deal of the cement produced is used in reinforced concrete construction, an increased demand for reinforcing steel is indicated, bringing the 1925 tonnage to a new high mark.

In the current increased cement production there is seen the effect of the numerous new cement plants and extensions recently completed, which have maintained the industry's productive capacity at a figure much in advance of any demand yet experienced. Incidentally, the building of these mills has created a market for a great variety of iron and steel equipment, as various machines used in the cement manufacturing process weigh several hundred tons apiece.

Many kinds of steel are used for reinforcing concrete in this country. Besides the familiar round and square bars, deformed bars of diverse patterns are made, ranging in form from the ordinary square twisted bar to the various grotesquely corrugated patterns. Channel bars, I-beams and angles have special applications, while steel mesh finds widespread uses in roads and floors. Two States have specified that only this material shall be used in their highways. In others, bars are commonly fastened together to form mats and are placed on the subgrade in this fabricated form.

Among the more unique uses of steel for reinforcing is the employment of cable wire stretched to tautness

before the concrete is placed around it. Steel hoops are used largely in reinforcing columns and steel shells in encasing concrete piles. In large foundations railroad rails provide a mat for the massive skyscrapers towering above them. The railroads, however, pioneered in reinforced concrete usage and construction in their early bridge building by creating such forms as the concrete trestle, the reinforced pile and the box culvert.

In some types of structures, such as large chimneys, where formerly materials often were used that required no steel in connection, the general adoption of concrete construction has brought a demand to the steel manufacturer for reinforcing bars. One of the illustrations shows the network of steel needed in constructing the great concrete chimney at Tadanac, British Columbia, said to be the tallest chimney of that type in North America.

Rail Steel Bars

Reinforcing bars made from old railroad rails are now meeting general acceptance, amounting to about 10 per cent of the reinforcing bars made. There are in the United States eighteen rail rolling mills, and in Canada one mill, equipped for rolling steel rail bars. These mills represent an outlay of approximately $20,000,000 and have a production each year of over 1,000,000 tons. The companies have formed the Rail Steel Products Association, which organization is now active in creating an enlarged market for their product.

Most of the rails used are obtained from the railroads, which make frequent replacements, due to the introduction of heavier locomotives, although some are rails found slightly imperfect after rolling and hence unfit for railroad use. The rails are split at the mill into three sections, the head, web and flange, which sections are treated as ordinary billets and rerolled into many shapes, including both plain and deformed reinforcing bars.* These bars partake of the nature of the rails from which they are made, being hard and durable and possessing high tensile strength. The Eighteenth Street Garage in St. Louis, said to be the largest garage in the world, with housing capacity for 2000 automobiles, contains 600 tons of rail steel bars in its concrete structure.

Steel finds its usage in reinforced concrete buildings of all kinds, public, industrial and private. Over a third of all cement is used in this class of structural work, most of which requires steel reinforcement. More than a fifth of the 145,000,000 barrels of Portland cement shipped during 1924 was placed in concrete roads, streets and alleys, which required a great volume of steel mesh and bars as reinforcement.

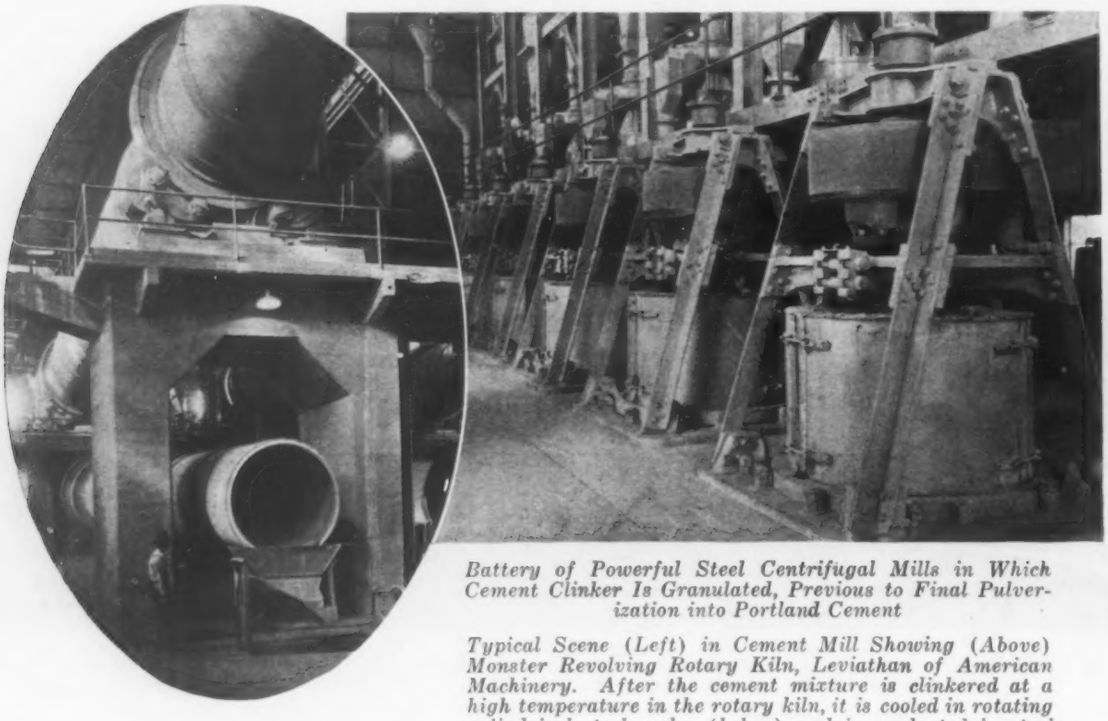
Value of Steel in Roads

An extensive survey of the efficacy of steel reinforcement in concrete roads will be reported to the fifth annual meeting of the Highway Research Board, to be held in Washington on Dec. 3 and 4. According to C. A. Hogentogler, chairman of the special investigation on the economic value of steel reinforcement in concrete roads, inspections have been completed on 375 miles of plain and reinforced concrete roads. These vary in age from one to ten years and contain approximately 300 comparison slabs, with and without steel, which were subjected to the same influencing conditions.

The roads inspected were located in many states, thus giving assurance of there being a sufficient number of direct comparisons to warrant drawing conclusions regarding the effect of steel as influenced by age, design, traffic, climate and subgrade as well as by the type, weight and placement of the reinforcement itself. The reinforcing steel in the experimental road stretches includes plain bars, deformed bars and steel mesh. Maintenance costs of both plain and reinforced concrete roads have been secured on a large mileage.

If a highly favorable report is made, based on analysis of the data and findings of the road inspections, it should have a marked influence in increasing the amount of reinforcing steel required for the satisfaction of the future needs of concrete road building.

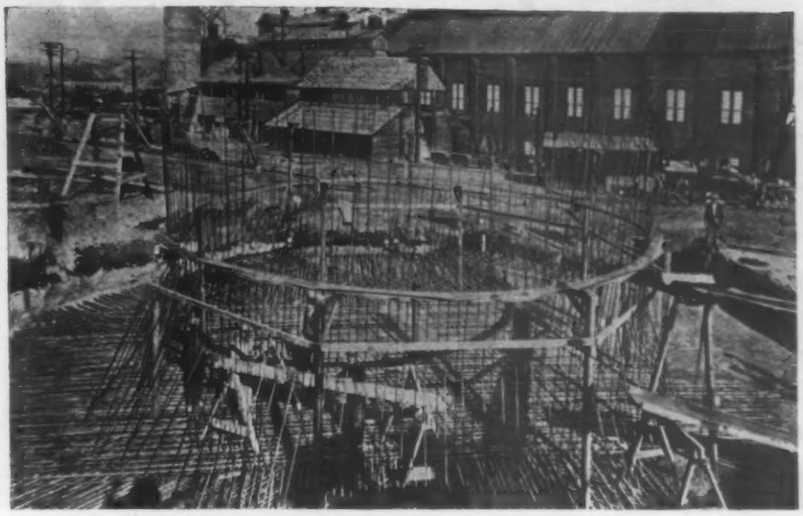
Not only is there a growing use of steel for reinforcement in concrete construction, but the cement industry itself employs great quantities of steel in the varied machinery required in carrying on the 80 operations incident to manufacturing Portland cement. Many of these, such as rock crushing and grinding, call for massive and powerful machinery. Perhaps the most impressive of these are the great rotary kilns used in cement clinkering—huge steel cylinders so large that an automobile truck could drive through one for 50 yards. A single modern kiln, with its bearings, contains some 435 tons of steel and iron.



Battery of Powerful Steel Centrifugal Mills in Which Cement Clinker Is Granulated, Previous to Final Pulverization into Portland Cement

Typical Scene (Left) in Cement Mill Showing (Above) Monster Revolving Rotary Kiln, Leviathan of American Machinery. After the cement mixture is clinkered at a high temperature in the rotary kiln, it is cooled in rotating cylindrical steel cooler (below) and is conducted in steel conveyor to the next stage in the manufacturing process

*Description of one of these plants and its methods appeared in THE IRON AGE, May 12, 1921, page 1227.



Maze of Steel Reinforcement for Foundation of Reinforced Concrete Chimney at Tadanac, B. C. This stack is 21 ft. in diameter at the base and will be 409 ft. in height

As several of the operations are highly destructive to machinery, alloy steels are being used to furnish stronger parts in the machinery, such as gyratory crusher shafts, which are subjected to severe strains or great abrasion. Large quantities of steel parts are carried in stock for replacements so that a cement plant, as long as it operates, creates a demand for steel directly and, through the use of its product in reinforced concrete, creates indirectly a much larger demand.

Placing the Reinforcement in a Ramp of the Eighteenth Street Garage in St. Louis, Said to Be the Largest Garage in the World. It has a housing capacity for 2000 automobiles. Six hundred tons of rail steel were used in reinforcing this structure

Use of Turret Lathes for Small Lot Production

The Warner & Swasey Co., Cleveland, has published an illustrated booklet which shows the way to make net profits from small lot production; that is, the making of 5 to 15 pieces of one kind at a time. The claim is set forth that the use of universal turret lathes for small lot production more than cuts the time in half. Several illustrations are cited showing records kept in the plants of some of the company's customers.

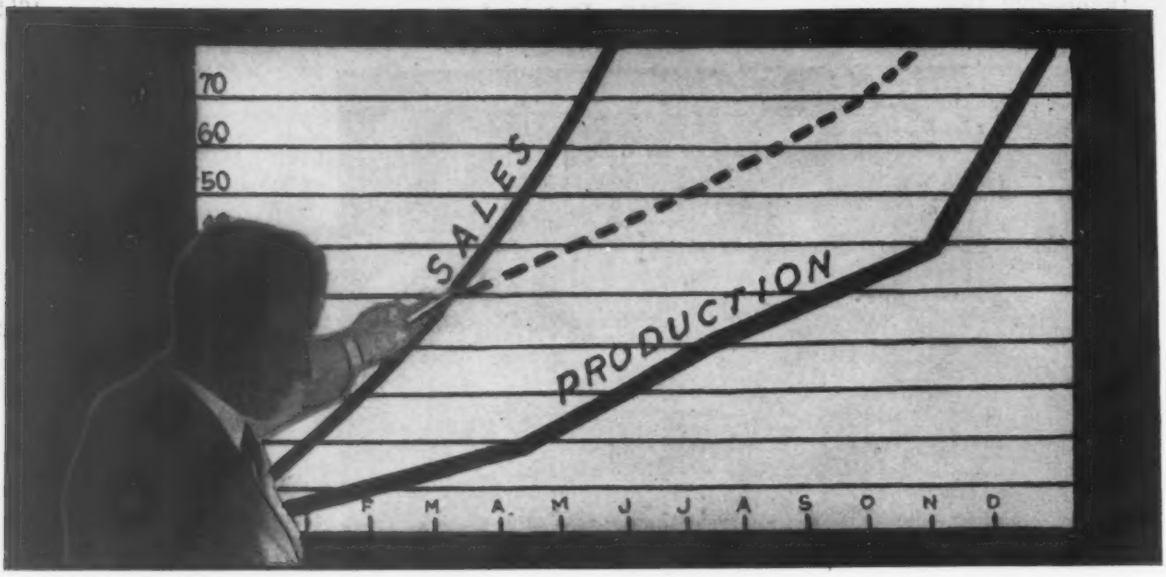
Part	Material	Number In Lot	Turret Lathe Time, Hr.	Engine Lathe Time, Hr.
Finger ring	Steel casting	10	11.5	25.0
Gear blank	Forging	6	5.4	12.0
Bushings	Bronze	12	4.7	9.0
Feed screw	Steel	9	6.7	16.0
Worm gear	Bronze	9	6.3	15.0
Sleeve	Cast iron	8	5.7	12.0
Friction	Cast iron	12	8.2	18.0
Collar	Steel	11	6.6	12.0
Wheel shaft	Steel	9	6.3	12.0
Piston rod	Cold-rolled steel	6	4.5	7.0
Gears	Steel	10	15.1	35.0
	Totals	102	82.0	173.0

One illustration shows two trays of miscellaneous work produced on one No. 1-A turret lathe in 10¼ days, as compared with 21¾ days on another type of machine. The work consisted of steel castings, bronze castings, cast iron and cold rolled steel. The sizes ranged from ¾-in. bar parts to 12⅛-in. chucking parts. The number of pieces in each lot varied from 6 to 12. The group of bar work was done first, then the tool equipment was changed and the group of chucking work was done. The accompanying table is printed showing the time required on various pieces.

Another table shows the actual set-up time for making 10 shafts on a No. 1-A turret lathe equipped with standard bar equipment consisting of three universal roller turners, one pointing tool, one die head and two tool holders. The shaft had five diameters and five shoulder dimensions and the actual set-up time was given as follows:

	Min.
Changing automatic collet bushings	10
Changing square turret tools	8
Setting 3 universal turners	33
Setting 5 hexagon stops, 1 square turret stop, and changing chasers	24
Total set-up time	75

The total time consumed in the plant where this work was done was formerly 12½ hr. for a lot of 10 shafts and the work is now done on a turret lathe in 3¼ hr.



Forecast Sales Before Budgeting

Estimate of Expected Business Necessary to Guidance of Business by Means of Departmental Budget Schedules

Meeting at the Hotel Astor, New York, Oct. 15 and 16, 350 members of the American Management Association focussed executive attention on the need for more accurate and detailed budgets and as a prerequisite, in most businesses, an estimate of anticipated sales.

"ONE of the tasks of the sales research department should be the forecasting of sales as a guide to the general activities of the business. These forecasts should form the basis for formulating the budget on the one hand and the establishment of sales quotas on the other." In these words Dr. Melvin T. Copeland, director, Bureau of Business Research, Harvard University, struck the keynote for the conference of the American Management Association.

Throughout the conference, speakers were emphasizing the need for better budgeting and in several instances the necessity for an adequate estimate of future sales was described as "essential." Whether this estimate be merely a ratio between last year's sales and anticipated business conditions, a fixed percentage of increase in gross sales, a small arbitrary gain in units sold regardless of price, or a careful estimate made by detailed examination of marketing conditions and territorial prospects, some sort of idea as to coming volume of business is necessary before an annual budget can be properly laid out.

That the proper method of securing a sales forecast is through careful and continuous research was the opinion of C. T. Hansen, assistant to the president, W. T. Grant Co., Chicago. Frequently a sales research department is buried under a mass of minor detail which should properly come under the sales or sales promotion department, for if sales research is to be done thoroughly, attention must be concentrated on one problem at a time.

In order to avoid congestion in this important department too—often considered a minor branch of the sales division—Mr. Hansen's company applies a number of tests to any problem which may be "wished on" the research department, as follows:

1. How clearly can the problem be defined? If it cannot be sharply outlined, the chances for a successful analysis are remote.
2. How long will the proposed research take and what will it cost? If the time or money required is excessive, the job is not attempted.
3. What practical use can be made of the results? For example, a research on future sales is of direct aid in planning budgets; if the suggested research does not lend itself to a dollars and cents application, drop it.
4. Is it feasible to undertake the collection and analysis of the data? Do the data exist in comparable form?
5. What other companies have had similar research problems? Can we use their experience? How can we get in touch with them?

Mr. Hansen mentioned the rapid growth of sales forecasting and sales research as being due to the need for a basis for departmental budget schedules and suggested that care in the selection and training of sales research men would be very well repaid. "The engineering mind is needed in the sales field," he said. "It is not absolutely necessary that the sales analyst be familiar with the product or manufacturing methods of the particular company for which he is to work, but it is essential that he be accustomed to the use of the scientific method—a precise and logical method of collecting, arranging and presenting facts."

J. H. Barber, assistant to the president, Walworth Mfg. Co., Boston, also emphasized the need for a forecast of sales for use in budgeting. Each branch or territory covered by jobbers is expected to get its share of the going business, and by conferences between the sales department and the branches, an approximate

idea is obtained of the increase which may be expected over a given length of time. The actual sales quota is not based on this expected increase, but is placed a little lower. Budgets planned on this "expectation minus enthusiasm" basis serve the manufacturing departments very well, since they provide for most of the materials and machines necessary and a slight speeding up of production can generally be undertaken without stress.

Although sales units of the Walworth Mfg. Co. are expected to live up to their estimates, the "must" requirements of each unit are placed a little higher than the volume for a past period and a little below the anticipated increase, so that branches and jobbers seldom fail to "make the grade" on the revised increase, whatever market conditions may be.

Another function of a properly organized sales research department is to so analyze sales that seasonal sales fluctuations are reduced to the minimum, said Ernest Draper, treasurer the Hills Brothers Co., New York. Many companies have manufacturing problems which would entirely disappear if sales were adequately analyzed. Seasonal fluctuations in business, resulting in unemployment, part time operation, increased proportional overhead and other unfortunate items, can often be met by concentrating attention to the distributive side of the business; by stretching out the selling season as long as possible. Redistribution of territories sometimes helps, as in the case of a company manufacturing floor polish, which found that practically all its sales were made to the Northern States and came during seven months of the year. An intensive development of the Southern market straightened out the sales curve.

Another method of avoiding seasonal sales fluctuations is to introduce supplementary lines. "This may take the form of introducing wholly new lines or of studying a product intensively and adapting it so as to meet other than seasonal needs. The difficulty met is that a sales organization which understands how to introduce one line may not possibly understand how to introduce another. Such difficulties, however, can often be overcome. A manufacturer of farm and garden implements introduced a special type of sled, the sale of which fitted in quite perfectly with his otherwise summer seasonal business. A producer of window screens took on a line of game boards selling to the Christmas trade and thus producing during the six months when his plant was normally idle."

The third method of avoiding seasonal pressure on sales and manufacturing departments is the often applied remedy of making for stock during the dull season. Many times this is accepted as the only method and frequently results in excessive cost burdens when a little sales research might eliminate the need for much of the production for stock. The sales department is too often considered an independent entity, free to "operate at its own sweet will," said Dr. Copeland in his talk on "Organizing the Marketing Function."

"Take the relation of the sales department to the production department. It is not satisfactory, ordinarily, for the sales department to dictate entirely to the production department as to what should be produced, and, on the other hand, it is equally unsatisfactory for the production department to dictate to the sales department as to what it may be permitted to sell. The chief executive must avoid having the two departments come to loggerheads on this question. The general policy regarding overselling or underselling the plant capacity also must be governed by the chief executive.

Sales Close to Finances

"The sales department similarly has a close relationship with the financial department. The determination of the general budget, which ordinarily should start with the forecast of sales, must be subject to approval by the chief executive with the cooperation of the sales and financial departments. The determination of the general credit terms likewise is a matter of general policy involving the two departments. When it comes to the handling of individual cases in the granting of credit and in making collections, a short circuit should operate between the sales department and the credit department. The credit department, as has been pointed out oftentimes, is in a position to aid materially in sales promotion. It has the task of safeguarding the integrity of the company's accounts receivable without stifling sales.

"In many businesses provision also should be made for close cooperation between the sales department and the purchasing department. By this I do not mean to imply approval of the practice of reciprocity in purchasing whereby materials are bought from a customer at a price differential in order to retain his patronage for the sales department. The sort of cooperation that I have in mind on questions of major policy, for example, is the decision of what and how much to buy.

"The sales department has relations with the accounting department on matters relating to accounts receivable, which arise out of sales, and also on accounting for expenses. The classifications of selling expense and the periods to be covered by the reports on selling expenses should be governed principally by the needs of the sales department for purposes of control.

"The advertising of the machinery manufacturer is influenced by the limits to the scope of his market and

High Lights from the Management Conference

"IT is fully as important to conduct day-by-day analysis of current sales as to develop elaborate sales research for the future. Too many sales analysts concentrate on statistics and forget methods and policies . . . they are scientific pilgrims temporarily resting in a strange land."

—C. T. HANSEN.

"WE have found that it frequently pays us to take orders below cost in order to help meet overhead burden when we are able to get back more than 60 per cent of the fixed overhead in addition to actual labor and material charges . . . the real point at which it becomes profitless to take on business of this sort can easily be determined by any company."

—LEONARD TYLER.

"IF the insiders do not cure the disease of unemployment, those outside the business are certain to attempt to find remedies. In other words, the business man must either accept the responsibility for a constructive attack upon unemployment or reconcile himself to attempted panaceas which may legislate him out of business in the effort to cure the evil."

—ERNEST DRAPER.

"ONE of the tasks of the sales research department is to forecast future sales as a guide to the activities of the business. These forecasts should form the basis for the sales budget on the one hand and for the establishment of sales quotas on the other."

—DR. MELVIN T. COPELAND.

by the technical knowledge which the potential customers have of the product. One of the chief tasks of the advertising in such a business is to make the potential customers familiar with the machinery manufacturing company's products and services and to secure inquiries for the salesmen to follow up. In other words, the advertising department, in order to secure the best results, should operate intimately with the sales department."

Speakers at the conference included W. R. Fletcher, the Stanley Works, New Britain, Conn.; R. A. C. Henry, Canadian National Railways, Montreal; Frank B. Cliffe, General Electric Co., Schenectady; E. M. Hickock, Western Electric Co., New York, and Leonard Tyler, vice-president Acme Wire Co., New Haven, Conn., whose interesting paper on "Forecasting the Manufacturing Program," is given below.

Among those registered at the conference were W. H. Abercrombie, Stockham Pipe & Fitting Co., Birmingham; Arthur Batts, Carborundum Co., Niagara Falls, N. Y.; Charles A. Brown, Lunkenheimer Co., Cincinnati; Frank B. Cliffe, General Electric Co., Schenectady; W. R. Coley, Leeds & Northrup Co., Philadelphia; J. T. Chidsey, Root Mfg. Co., Bristol, Conn.; V. F. Covert, Westinghouse Electric & Mfg. Co., East Pittsburgh; A. B. Cressler, Middletown Car Co., Middletown, Pa.; W. L. Damill, Yale & Towne Mfg. Co., Stamford, Conn.; H. R. Davies, Westinghouse Electric & Mfg. Co., East Pittsburgh; J. M. Davidson, Yale & Towne Mfg. Co., Stamford, Conn.; John V. N. Dorr, E. B. Witte and Dr. R. B. Moore, Dorr Co., New York; Henry Duckwith, Norton Co., Worcester; W. R. Fletcher and L. W. Young, Stanley Works, New Britain, Conn.; F. A. Buchda, Eaton Axle & Spring Co., Cleveland; W. J. Burns, National Cash Register Co., Dayton; E. P. Campbell, White Motor Co., Cleveland; Mrs. Frank B. Gilbreth, F. B. Gilbreth, Inc., Montclair, N. J.; R. H. Goodwillie, Otis Elevator Co., Yonkers, N. Y.; S. S. Goulds, Goulds Mfg. Co., Seneca Falls, N. Y.; W. E. Green, Manning Abrasive Co., Troy, N. Y.; H. L. Gregg, Bristol Co., Waterbury, Conn.; Oscar Grothe and A. S. Rodgers, White Sewing Machine Co., Cleveland; Hewitt Brower, Acme Wire Co., New Haven, Conn.;G. H. Jernburg, Fairbanks, Morse Co., New York; Sam A. Lewisohn, Miami Copper Co., New York; M. R. Lott, Sperry Gyroscope Co., Brooklyn, N. Y.; James C. McCullough, Pennsylvania Railroad, Pittsburgh; John Mitchell, General Electric Co., Schenectady; W. G. Moore, Standard Steel Car Co., Pittsburgh; F. R. O'Donnell, White Motor Car Co., Cleveland; H. B. Ohrer, Ohrer Fare Register Co., Dayton; W. A. Pierce, Dayton Steel & Foundry Co., Dayton; F. A. Pope, Worthington Pump & Machinery Co., Harrison, N. J.; C. S. Redding, Leeds & Northrup Co., Philadelphia; C. S. Smith, Western Electric Products Co., Mansfield, Ohio; J. L. Stone, Henry Disston & Sons, Inc., Philadelphia; C. A. White, Leeds & Northrup Co., Philadelphia, and Noah F. Young, Lumen Bearing Co., Buffalo.

Forecasting the Manufacturing Program

BY LEONARD TYLER

VICE-PRESIDENT, ACME WIRE CO., NEW HAVEN, CONN.

THIS is the production department's end of a comprehensive budgetary plan for a manufacturing plant.

The simplest way is to get from the sales department a monthly or weekly estimate of what the deliveries may be expected to be on each line of product for the entire period which the plan is expected to cover. Such an estimated schedule of production can then be broken down into the component operations and so be translated into machine hours of standard rate production for the groups of machines involved.

In the same way, the materials which will be required for such a program can be determined and scheduled on a basis which will keep the shop supplied with the least investment in inventory. Using the schedule of machine hours which the program calls for, a percentage of activity for each of the manufacturing departments can be laid out by weeks or months and from this a reasonable estimate can be made as to each of the following points:

(a) Amount and cost of supervision;

(b) Amount and cost of indirect labor in the department, such as inspectors, machine setters, etc.;

(c) Amount and cost of miscellaneous department supplies;

(d) Probable rate of call on the auxiliary or service departments.

By applying this outline to all of the manufacturing departments in turn, a collective demand for each of the service departments can be set up from which a schedule for each can be laid out just as the schedule for the manufacturing departments was made from the sales department's estimated program of deliveries.

From such a schedule, the heads of the service departments can, in their turn, give estimates of

(a) Amount and cost of supervision;

(b) Amount and cost of indirect labor;

(c) Amount and cost of direct labor (if wanted);

(d) Amount and cost of supplies and materials.

These last estimates, especially where special tools, jigs, patterns, etc., are a material item, will not be as close as the estimates for the manufacturing departments, but every shop has a pretty fair idea of the average cost of such elements and on any volume of production such average figures will work out with sufficient accuracy to fulfill all the expectations of a practicable budget plan.

I have assumed, in outlining this plan, not only that the sales can be forecast over a considerable period of time, but also that the shop has

(a) A system of measured task or payment by results which enables a program of production to be accurately scheduled against the manufacturing departments;

(b) A system of machine hour distribution of burden costs so that supervision, indirect labor, supplies and service department cost can be easily redistributed to the manufacturing departments;

(c) A record of service department costs against varying percentages of activity in the manufacturing departments sufficient to check the heads of the service departments in their estimates under this scheme.

But what if the sales department can not give any reliable estimate of what the sales will be over the period under construction? Such cases exist, and that of the Acme Wire Co. is an excellent example.

Budgeting Without Sales Forecast

Does that mean that no benefit can be obtained from an attempt to forecast the production program? I do not think such a deduction necessarily follows if we consider the purposes for which a budget or forecasting plan is adopted. Two of these purposes are:

(a) Planning ahead for the volume of work anticipated, so that it may be begun and carried through smoothly and as rapidly as possible;

(b) Setting up a standard both of performance and cost of performance by which what is actually done can be checked.

In these respects a complete sales department estimate of sales for a year or six months or whatever the period may be, is not absolutely essential however convenient it may be. We can start at the shop end

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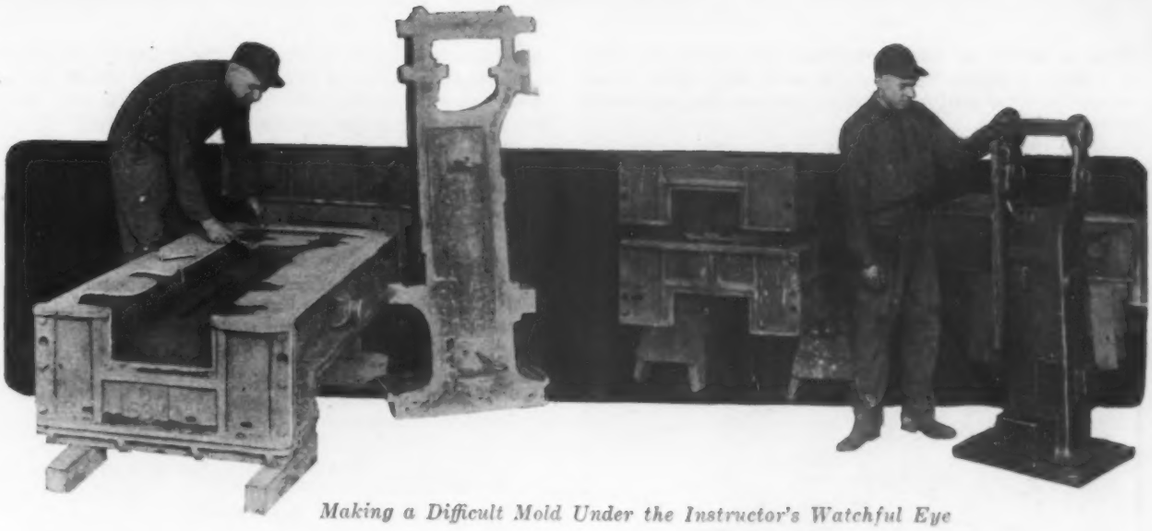


Making a Difficult Mold Under the Instructor's Watchful Eye

Practical Training for Foundry Work

How Brown & Sharpe Make Skilled Molders in Three Years—and Have a Waiting List of Applicants

BY C. M. MORRIN*

"BILL—get me a couple of molders in a hurry," said the foundry foreman to the employment man.

"Easier said than done, Tom," was the reply.

"What? With business easy there ought to be any number on the loose pulley. Why, when I was doing my own hiring I could pick one up at any time. Bill, you employment fellows don't keep track of them. Why, the old-timer would pass the word around that there was an opening and in no time a flock would be in looking for the job."

"Say, Tom, pardon the interruption, but I hear Jerry Peters died yesterday."

"No, Bill, is that so? By gosh, that's the fifth of the old gang to pass along in the last two months. Ed Johnson took that foreman's job at the East Works and Harry Holmes started a trucking business. By jinks, we soon won't have any old-timers left. Why—."

"Now you *have* said something," the employment man interrupted. "Here's where I'm asking you a question. How many are you training in that foundry of yours to replace them?"

"None; haven't time. It's up to the employment office to find men for us. We're down on the floor getting out work. Men don't bother us any more; what with you and the scheduling department and all this office management, we don't have to worry about such things the way we used to. Huh, train 'em! Where'd we find time to train 'em if I could find a kid foolish enough to want to learn the trade?"

Statements similar to the foregoing are heard time and again in our foundries. The thought is only of the present. "Let someone else do the training, we haven't the time," is the general attitude of the management. "Why should my boy spend three or four years as an apprentice when he can go into the shop and make good money operating?" is the thought of the employee.

This attitude is now having its effect. Restricted immigration added to the existing lack of training has created a serious condition.

A Serious Situation

FOUNDRIES are feeling the shortage of trained labor very keenly. Trained molders are scarce and will continue to be so until definite steps are taken to remedy the conditions now existing. Intensified training programs, special school courses and the like, while undoubtedly good, do not begin to replace well organized training courses in the foundries and shops.

A good artisan should learn by actually doing the various operations necessary for a broad training. The work should be of a commercial character, work that he knows has a value; and should be done under actual production conditions with enough repetition to give a continued understanding. He should be taught the whys and wherefores of the various problems that arise in his daily work; and should not be carried along blindly with nothing but routine instruction.

The lack of training programs cannot be wholly laid to the present generation. The tendency away from apprenticeship began with the development of labor-saving machinery and the introduction of the modern factory system. This breaking down of the old forms of training was so gradual that it had little effect in the beginning. Now it is a serious problem and together with restricted immigration has created a condition that must be overcome.

What Can Be Done?

ONE thing that can be done is to make our foundries as attractive as possible in their physical conditions. Good light and ventilation should be given thorough study. An educational program should be inaugurated placing before the public the advantages of training. Cooperation with the school systems and the encouragement of trade and technical schools, as well as an active participation in their affairs should be the duty of the management.

But there must be something concrete offered to young men in order to hold their continued interest. They should be shown a well organized plan of education and be assured that such a plan is carried out in the foundry and shop. Their work should be laid out to cover satisfactorily the field in their chosen trades. The management and executives should take a keen interest in the work of their apprentices and make them feel that the management have their interests at heart. In other words, the apprentice should mean more than a cheap hand or operator. He should be looked upon and trained as one of the leaders of the future management.

The Brown & Sharpe Mfg. Co., Providence, R. I., has carried on an apprenticeship program for a number of years with courses including training for machinist, drafting, screw machine operating, pattern-making, molding, and coremaking.

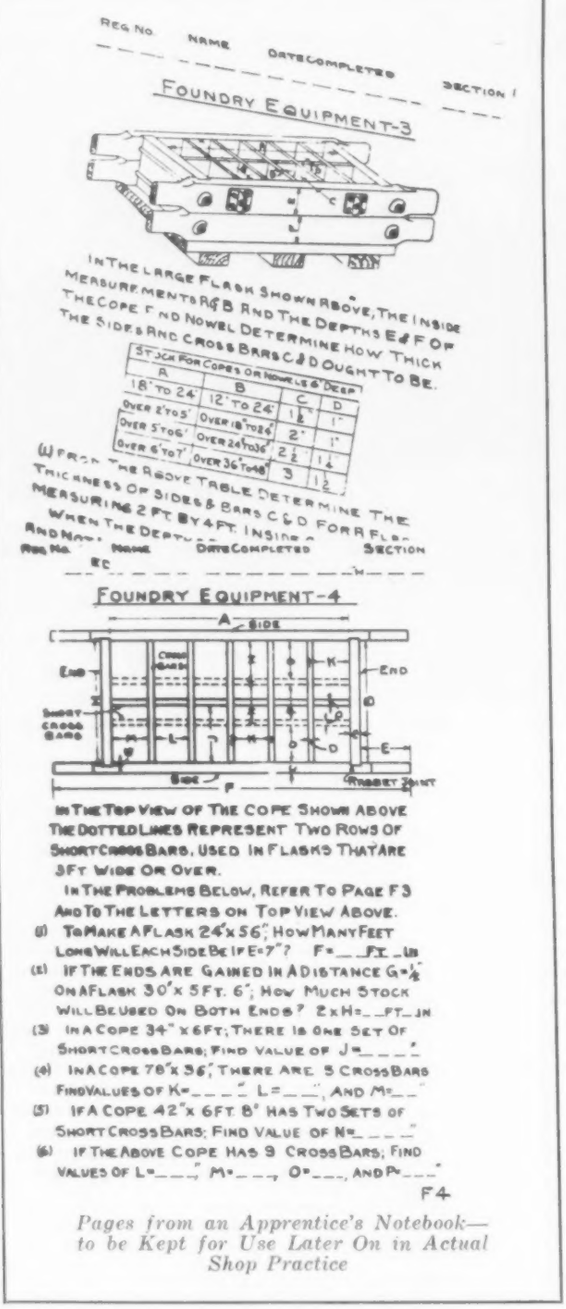
All apprentices come under a centralized control.

*Supervisor of apprentices, Brown & Sharpe Mfg. Co., Providence, R. I.

This is known as the apprentice department and has a definite schedule laid out for each boy. This tends toward a more uniform training and avoids haphazard shifting of jobs.

The apprentice department is also responsible for the selection of the boys. Whenever possible the applicant visits the factory. He is taken for a trip through the shop and shown the various operations and working conditions and sees other boys at work.

Boys who do not satisfactorily pass this interview yet seem to be good material are told to call again at


REG. NO. NAME DATE COMPLETED SECTION

FOUNDRY EQUIPMENT-3

IN THE LARGE FLASK SHOWN ABOVE, THE INSIDE MEASUREMENTS A & B AND THE DEPTHS E & F OF THE COPE AND NOWEL DETERMINE HOW THICK THE SIDES AND CROSS BARS C & D OUGHT TO BE.

STOCK FOR COPES OR NOWELS 6" DEEP

A	B	C	D
18" TO 24"	12" TO 24"	1½	1"
OVER 2' TO 5'	OVER 18" TO 24"	2"	1"
OVER 5' TO 6'	OVER 24" TO 36"	2½	1½
OVER 6' TO 7'	OVER 36" TO 48"	3	1½

(1) FROM THE ABOVE TABLE DETERMINE THE THICKNESS OF SIDES & BARS C & D FOR A FLASK MEASURING 2 FT. BY 4 FT. INSIDE WHEN THE DEPTH ... AND NOWEL.

REG. NO. NAME DATE COMPLETED SECTION

ETC.

FOUNDRY EQUIPMENT-4

IN THE TOP VIEW OF THE COPE SHOWN ABOVE THE DOTTED LINES REPRESENT TWO ROWS OF SHORT CROSS BARS, USED IN FLASKS THAT ARE 3 FT WIDE OR OVER.

IN THE PROBLEMS BELOW, REFER TO PAGE F3 AND TO THE LETTERS ON TOP VIEW ABOVE.

(1) TO MAKE A FLASK 24"x56", HOW MANY FEET LONG WILL EACH SIDE BE IF E=7"? F=___FT.___IN

(2) IF THE ENDS ARE GAINED IN A DISTANCE G=½" ON A FLASK 30"x5FT. 6", HOW MUCH STOCK WILL BE USED ON BOTH ENDS? 2xH=___FT.___IN

(3) IN A COPE 34" x 6FT; THERE IS ONE SET OF SHORT CROSS BARS; FIND VALUE OF J=___"

(4) IN A COPE 78"x36", THERE ARE 5 CROSS BARS FIND VALUES OF K=___", L=___", AND M=___"

(5) IF A COPE 42"x 6FT 8" HAS TWO SETS OF SHORT CROSS BARS; FIND VALUE OF N=___"

(6) IF THE ABOVE COPE HAS 9 CROSS BARS; FIND VALUES OF L=___", M=___", O=___, AND P=___"

F4

Pages from an Apprentice's Notebook—to be Kept for Use Later On in Actual Shop Practice

a later date. They are given information about the trade for which they have applied, and told to give more serious consideration to the step that they are about to take. This is for the purpose of securing boys with a real interest and to discourage those that are merely seeking jobs.

Examining the Candidates

AFTER a boy satisfactorily passes the interview he is asked to complete an application which gives a general idea of his experience and references that may be followed up. He is then given a mathematical examination in subjects such as the average grammar school graduate should know. A physical examination in the nature of an inspection of eyes, ears, throat, feet, heart, lungs, and for hernia is also required. If he meets the requirements he is told to report for work on trial at a given date.

This trial period is for three months in all trades and covers such general operations as would bring out the boy's fitness for the work. This period gives an opportunity to weed out the unfit and half-hearted applicants before definitely signing them as apprentices.

While serving this trial period the boy is rated each month on his industry, deportment, workmanship and mechanical judgment by the department foreman for whom he is working. These marks are also checked by the shop instructor; and any question or doubt as to correct markings is investigated. A uniform method of marking is used and the shop marks together with the school marks are averaged at the end of the trial period.

Require Fee Payment

IF the boy has been rated a passing mark he is asked, together with his parent or guardian, to sign a formal agreement and to deposit a fee which varies with the different trades. This agreement covers the varying periods for the different trades as follows: machinist, 4 years; patternmaking, 4 years; drafting, 2½ years; screw machine operating, 2 years; molding, 3 years; coremaking, 1½ years. In all cases the trial period is included as a part of the time to be served. The fee that is paid can either be paid in cash, or arrangements can be made to pay it in stated weekly amounts. At the successful completion of the apprenticeship this fee, together with a bonus, varying with the different trades, is returned to the boy.

In addition to the instruction given by the shop foremen there is also a shop instructor connected with the apprentice department whose dufy it is to visit the boys in the shop at regular intervals and see that they are getting the proper work and instruction. He acts as a go-between from the boys to the foremen.

The school work is cared for by means of classroom studies during working hours but is without the use of text books. Most of the problems are on shop practice; and an effort has been made to correlate the shop and school work so that the boy is doing the actual work in the shop while he is receiving the theoretical training in the school room. The instruction, while carried on in classes, is more or less individual and is under the supervision of an instructor. A certain amount of home work is also required to be done each week. The different courses have been laid out to cover the company's own particular needs and vary with each trade. The problems are printed on loose-leaf sheets, and the boys work out the examples on the reverse side of the sheets so that when they are completed they form a handy reference book for future years.

Another practice that has worked out successfully is the formal system of interviews whereby the apprentices are brought at stated intervals in touch with the Brown & Sharpe officials. This creates a personal contact that proves helpful and causes the boys to feel that the officials are interested in their individual development. It also gives the heads of the departments an opportunity to meet the boys and choose likely material for future development.

System of Payment

THE apprentices are paid for both their shop and school work, and during their trial period as well. The wages are increased each year, or period, according to the schedule of their courses. Twice a year the marks from the shop and school are averaged and a report of the boy's progress is sent to his parent or guardian. If the boy rates an "Excellent" mark in both shop and school he is granted a bonus to be held as long as he maintains his "E" rating. The boys also receive some contract or piece work; but this is not guaranteed as it is the intention to give a thorough training rather than an opportunity to carry on routine operations with a chance to increase the wage rate.

The foundry course furnishes a good illustration of the method used in moving boys from one department to another for their training. In the case of the molders the whole of the first year is spent in what Brown & Sharpe term their heavy foundry. Work in this particular section is general in character and gives the boy a broad training.

For the first four months including the trial period he acts as a helper to one of the molders. As he develops he is placed on what is termed the side floor country as well. For the out-of-town boys a dormitory is operated under the supervision of a matron. No attempt is made to serve meals at this house; but rooms are provided at a nominal charge. This dormitory acts as a social center for the boys and is very helpful in creating a fraternal spirit among them.

Sports and social events are encouraged; but the boys are made to feel that they should carry these on independently of the management and on their own initiative, and they have formed an association for the

This Home for Out-of-Town Apprentices Looks Like a College Dormitory

where he is given work to do on his own initiative under the supervision of a foreman. After a time on the side floor he is transferred to the crane work where he works under a journeyman, who assigns work to him and follows him through to see that it is properly done.

The first three months of the second year are given over to coremaking. In this department the boy is started in the heavy coreroom and works under the supervision of a journeyman coremaker. After about a month and a half in the heavy coreroom he is put into the light core department where he is given work that he can carry on by himself. From here he returns to the heavy foundry where is is given work with the thought that he can carry it on on his own initiative and will bring about a more rapid development than if he were under the supervision of a trained molder.

During the first three months of the third year he is given bench work, usually beside a molder who is picked for his ability to handle boys and is a thorough workman. It is his duty to give the boy all necessary instruction about his work in addition to that given by the foreman. Next he is placed on the molding machines where he spends about two months doing the regular routine work of such machines.

After the molding machine work he returns to the heavy foundry again; and is expected to carry on work entirely on his own initiative, but, of course, under the supervision of the foreman. He spends five months on this heavy foundry work and then goes to the cupola for about a month where he learns mixtures, charging, pouring and work of a like nature. He then returns to the heavy foundry to complete his time. This last month gives an opportunity to watch his adaptability for the various kinds of work so that at the end of his apprenticeship he can be given a chance to follow up the particular kind of work that he prefers.

The apprentices at Brown & Sharpe come not only from Providence, but from many other parts of the purpose of furthering their various activities. It is felt that by doing this more interest is taken in these activities than if they were planned and fostered by the management.

British September Output Increased

LONDON, ENGLAND, Oct. 15 (*By Cable*).—The pig iron output in September was 448,700 gross tons, compared with 444,500 tons in August and 492,700 tons in July. The September steel production at 638,900 tons shows a large increase over the 477,100 tons made in August.

Comparative production figures for the British steel industry in gross tons per month are as follows:

	Pig Iron	Steel Ingots and Castings
1913, per month.....	855,000	639,000
1920, per month.....	669,500	755,600
1921, per month.....	217,600	302,100
1922, per month.....	408,300	486,000
1923, per month.....	619,800	707,400
1924, per month.....	609,900	685,100
January, 1925	569,400	605,100
February	534,100	646,400
March	607,900	684,700
April	569,800	597,600
May	568,000	651,600
June	510,300	585,400
July	492,700	590,400
August	444,500	477,100
September	448,700	638,900

Daily average freight car movement in June is reported by the Bureau of Railway Economics at 27.4 miles, compared with 25.1 miles in June, 1924, and with 28.3 miles in June, 1923. The average load per freight car in June was 26.9 tons, compared with 26.7 tons last year and 28.2 tons in June, 1923. Ton-miles per car per day figured out at 737 in June, 1925, against 670 in 1924 and 798 in 1923. The goal of 900 represents 30 tons and 30 miles.

Which Form of Invoice Is Best?

Ford Motor Recommends Multiple Billing Form—Standard Invoice Already Endorsed by Many Groups Is Claimed to Meet All Normal Requirements

EACH of 35 average size business houses was asked to estimate the amount which it could save in clerical help annually, provided all invoices received were on a standard invoice form. The total of estimated savings was $21,700, an average of $620 annually.

This was the saving that the National Association of Purchasing Agents had in mind when they called a conference of some 400 trade and professional associations in Philadelphia four years ago to adopt such a standardized invoice. The so-called standard invoice form, here shown, was indorsed by several large groups at that time and has received the approval of many other organizations since 1921. It is being widely used today and its growth has been steadily accelerated since initiation.

Recently, however, a competitor has entered the field, in the form known as the uniform invoice suggested by F. H. Diehl, purchasing agent, Ford Motor Co., Detroit. It has naturally been devised to simplify the accounting and clerical problems of a large corporation in a specific line of business, and Mr. Diehl is convinced that it will be able to solve many of the difficulties of other concerns. That it is an improvement over the multiplicity of invoice forms now prevalent is, of course, admitted.

E. J. Kulas, president Otis Steel Co., Cleveland, writes in *Trade Winds*, house organ of the Union Trust Co., of that city, advocating the use of Mr. Diehl's form:-

> Throughout, instead of a multiplicity of ill-assorted sheets of varied sizes and shapes, whose data are half-obliterated by the necessity of placing various approval stamps thereon, there is but a single sheet, or at most a great reduction in the number of invoices, each one of which is uniform in every detail so that checking, posting and listing becomes not a tedious labor but the rapid operation which characterizes use of an old and familiar form whose every detail is constant and unchanging.
>
> Of course, the form as shown would necessitate certain changes for the individual business insofar as the column headings are concerned, although the top half would seem to be requisite for every business.
>
> Mr. Diehl's form has the following substantial

National Association of Purchasing Agents

Woolworth Building, New York

Customers: Ord. No & Date; Requisition No.; Contract No.; Shipped To; Destination

Invoice Date; Invoice No; Shipper's Order No.

Column reserved for use of customer. P. A. Invoice No; Voucher No

Terms

CHECKED: With order; F. O B. point; Price; Calculations; Transportation; Trans. Chgd. Back

Date Shipped; From; F. O B.

Car No. and Int.

How Shipped and Route

DESCRIPTION	QUANTITY (SHOW UNIT)	PRICE PER UNIT	AMOUNT

The National Standard Invoice Form should be on a sheet 8½ inches wide and either 7, 11 or 14 inches long. A tolerance of ⅛ inch in either dimension is contemplated. Invoices longer than 7 inches should have dots or short rules printed on sides 7 inches from top to indicate point of fold.

Head may be moved down if more space is required for shipper's name, address, etc. Line spacing may be suited to machine or hand writing maintaining same relative position.

The name of the National Association of Purchasing Agents is intended to be replaced by that of the vendor.

Above Materials received_____ 192__ and found_____ satisfactory (Signed)_____ (Title)_____

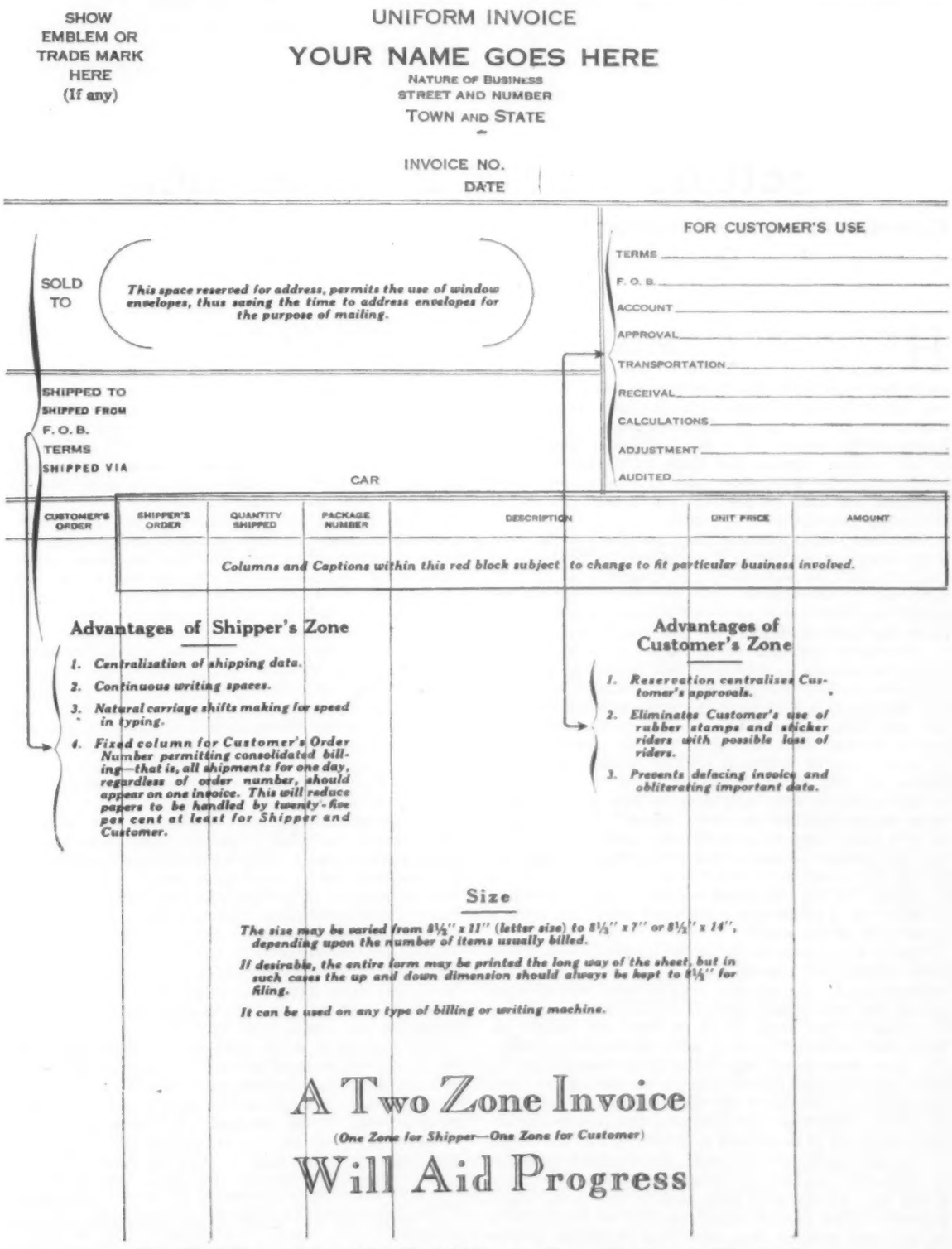
Charge Account — Approved — Approved

This Is the Standard Invoice Recommended by the Department of Commerce

advantages: It permits maximum speed and accuracy, since it centralizes all shipping data and gives a continuous writing space with natural carriage shifts for the typist. Furthermore, it gives a fixed column for the customer's order number, permitting a consolidated billing. In other words, it permits you to list all shipments for any single day, regardless of their order number, on a single invoice, thus reducing papers to be handled by both shipper and customer by at least 25 per cent.

In addition it reserves and centralizes the space for accepted headings for the customer's approval notations, thus eliminating the use of the customer's rubber stamp and sticker riders, with possible loss of riders, obliteration of invoice and confusion which unavoidably appears in the present day hit-or-miss method of invoicing, owing to the obliteration or defacement of important data.

In addition to the features mentioned, you will note that space is reserved for the address in such a manner as to permit the use of a window envelope, thus saving the necessity of addressing


SHOW EMBLEM OR TRADE MARK HERE (If any)
UNIFORM INVOICE
YOUR NAME GOES HERE
NATURE OF BUSINESS
STREET AND NUMBER
TOWN AND STATE
INVOICE NO.
DATE
SOLD TO
This space reserved for address, permits the use of window envelopes, thus saving the time to address envelopes for the purpose of mailing.
FOR CUSTOMER'S USE
TERMS
F. O. B.
ACCOUNT
APPROVAL
TRANSPORTATION
RECEIVAL
CALCULATIONS
ADJUSTMENT
AUDITED
SHIPPED TO
SHIPPED FROM
F. O. B.
TERMS
SHIPPED VIA
CAR
CUSTOMER'S ORDER
SHIPPER'S ORDER
QUANTITY SHIPPED
PACKAGE NUMBER
DESCRIPTION
UNIT PRICE
AMOUNT
Columns and Captions within this red block subject to change to fit particular business involved.
Advantages of Shipper's Zone
1. Centralization of shipping data.
2. Continuous writing spaces.
3. Natural carriage shifts making for speed in typing.
4. Fixed column for Customer's Order Number permitting consolidated billing—that is, all shipments for one day, regardless of order number, should appear on one invoice. This will reduce papers to be handled by twenty-five per cent at least for Shipper and Customer.
Advantages of Customer's Zone
1. Reservation centralizes Customer's approvals.
2. Eliminates Customer's use of rubber stamps and sticker riders with possible loss of riders.
3. Prevents defacing invoice and obliterating important data.
Size
The size may be varied from 8½" x 11" (letter size) to 8½" x 7" or 8½" x 14", depending upon the number of items usually billed.
If desirable, the entire form may be printed the long way of the sheet, but in such cases the up and down dimension should always be kept to 8½" for filing.
It can be used on any type of billing or writing machine.
A Two Zone Invoice
(One Zone for Shipper—One Zone for Customer)
Will Aid Progress

The Purchasing Agent of the Ford Motor Co. Urges the Use of This Invoice

an envelope in addition to the other very major saving accruing through the use of such a standard form.

W. L. Chandler, secretary National Association of Purchasing Agents, however, explains that each form contains everything listed on the other, the differences being two:

> The important one is what might be called multiple billing. The Ford Motor Co. desire to have one invoice cover as many orders as possible, the result being that they must have the order numbers listed in the body of the invoice in the two columns shown. Most customers, however, prefer the newer method of a separate invoice for each order to facilitate accounting procedure. In some lines of business this plan is absolutely necessary. In the case of the standard invoice form, we suggested to Mr. Diehl that the words "see below" could be inserted on the standard form and the order numbers placed in the body of the invoice just as he wanted whenever billing to Ford Motor. This would permit the remainder of the customers to have the benefits of unit billing.
>
> The other difference I feel is so trivial as to require very little consideration. That is, whether the tail of the invoice should be put in the head. Those who sign on the tail of the invoice can do so readily, and I see no worthwhile argument either for its being on the tail or in the head, except one which was advanced some time ago to the effect that the bottom edge of an invoice is usually difficult to use in billing and that the space there can be spared quite readily.

The stamp of approval of that famous organization of the Department of Commerce known as the Division of Simplified Practice has been given to the standard form of the purchasing agents. The National Association of Cost Accountants has approved the same form, as has the Division of Purchases and Stores of the American Railway Association.

Setting a Pace for Salesmen

How One Company Increased Volume 150 Per Cent by Establishing Territorial Quotas—Selling Costs Halved Simultaneously

BY G. T. AITKEN*

HOW to cut down selling expenses and at the same time increase the volume of business is the task facing every manufacturer and dealer. Many executives are successful in reducing the cost of selling without materially adding to the gross sales, while others are able to run up the total sales by means of heavy selling costs. It is the fortunate combination of low selling expense and large sales that we have achieved in the past year. In that period we have increased our sales 150 per cent and reduced our selling costs approximately 50 per cent.

In July, 1924, our company adopted a plan for more intensive direction of salesmen to insure more frequent calls on customers and prospects. The first move was to tabulate on cards the names of all firms which had ever been recorded as purchasers. Even those that had not bought for years were listed.

The cards, grouped according to cities and territories, were made in triplicate; one copy was kept for permanent record and mailing list; another was given the machine tool salesman; the third was for the supply salesman. Comparison of the cards with sales sheets showed that we were selling approximately 12½ per cent of the total number of accounts listed during the life of the company.

Six salesmen were employed on July 1, 1924. They were routed through the card system. At the beginning of every week to each man was given cards covering the number of towns and cities which it was believed he could work during that week. Lack of knowledge of the individual customer and uncertainty as to the time required for each call made this largely guesswork at the start.

Cards were given to the salesmen not only to direct their efforts, but also to have them obtain necessary information for the records, such as personnel of companies and their requirements. At the end of each day the cards of the firms called on, with the desired information written in pencil, were mailed to the office. The data were there transcribed to the permanent file card and were also typewritten on the salesman's card, which was set ahead in the files in anticipation of his next call. Moreover, the salesman was required to return the cards of customers on whom he had not called.

On the receipt of the cards, daily acknowledgment of courtesies extended was made by post card to those called on. Cards were also sent to the firms which salesmen failed to visit, expressing regret for inability to call and stating that mail and telephone orders would be given prompt attention.

The number of calls, inquiries, proposals, orders and new accounts of each man were recorded daily.

Results of the new method began to show almost immediately. Instead of selling approximately 12½ per cent of the total number of accounts, in August, 1924, we called on 33 per cent of the total customers listed and sold 42 per cent of them or 13.86 per cent of the total number. By September salesmen were complaining that their territories were too large and the sales force was increased by three men.

Since the adoption of this plan, we have never opened less than fifty new accounts each month, listing any customer as new who has not made a purchase within twelve months. By the end of the year the calling list was increased to 40 per cent of the total with the same productive results—selling 42 per cent of those visited.

The volume of business had been augmented at the same time—an increase due partially to a better understanding of the lines represented and their adaptability to the territory. This knowledge was reached by listing the lines and securing an estimate from each territory of the volume therein on each product. The estimates, when compiled, gave a quota for each line; the total of these was the gross quota for the entire territory for 1925.

Inauguration of this part of the plan was viewed as a tremendous task, but it proved what we had anticipated, that salesmen often did not know the lines that were represented by their price sheets and customers were unaware of many lines that we carried. It showed that the territories were still too large, for they protested that they could not adequately cover their customers and prospects and do justice to all lines. Therefore, a second addition was made to our sales force, four more salesmen. Today we have nine territories and thirteen men as compared with three territories and six men a year ago.

The managers of the machine tool department and the supply department spend four days of each week in actual sales contact with their men, helping them to become better salesmen and to have a more intelligent understanding of the products that they sell.

Here, in brief, are the results of the adoption of this program, from Aug. 1, 1924, to June 1, 1925:

1. An increase of 16⅔ per cent in the number of calls.
2. An increase of 12 per cent in the number of customers listed.
3. An increase of 7½ per cent in the number of active accounts.
4. An increase of 20 per cent in the number of lines sold.
5. An increase of 150 per cent in the volume of business.
6. A reduction of nearly 50 per cent in selling costs per dollar of sales.

*Sales manager, Vonnegut Machinery Co., Indianapolis.

Making Basic Open-Hearth Steel

Operating Officials, Meeting at Cleveland, Discuss Furnace Design, Practice, Yield, Refractories and Other Items Relating to Production, Quality and Cost

OPEN-HEARTH steel making problems were discussed at a three-day meeting at the Hotel Cleveland, Cleveland, Oct. 13, 14 and 15. It was a gathering of open-hearth superintendents and metallurgists identified with rolling mills using open-hearth steel. It represented a movement energized by the American Institute of Mining and Metallurgical Engineers last April. Organized as a committee of open-hearth superintendents to make detailed studies of the process from the standpoints of production, cost and quality, it began with the appointment of three sub-committees, on design, on practice and yield and on refractories. Thus some 50 operating department heads came together at Cleveland. They met without formal program or papers but instead with the informal presentation of points of practice and opinion offered through assignment by a few committee members. The result was the somewhat free and easy atmosphere of the round table type of discussion. At times views and figures apparently represented the ideals of the speakers rather than the actualities but as acquaintance widened among the participants there was a disappearance of any intention of window dressing. On the whole the meeting was marked by frank and generous statements from most of those present, and it was pronounced in the conversations between sessions as individually very much worth while. The acid process received relatively little attention, most of the companies represented making basic steel. A brief review of the first day's sessions was given in THE IRON AGE of last week.

Plans of Steel Making Committee Outlined

IN a brief opening address, John V. W. Reynders, president, American Institute of Mining and Metallurgical Engineers, emphasized that the movement promises to be of marked value, particularly as it represents group action all directed to one object. He pointed out how today the industry is particularly concerned with the reduction of costs. With the production rate at the moment only 10 per cent below the maximum for a given year and yet not much over 75 per cent of capacity, there are small margins of profits, and these the operating man is expected to neutralize.

He pointed out how the situation has come about in part as the result of the increased output obtained from individual furnaces, amounting to as much as 25 per cent over the past few years. He ventured to say, nevertheless, that the open-hearth process was far from the end of the path toward improvement; that in five years there would be items in open-hearth practice not now dreamed of. In passing, he mentioned the patenting by Benjamin Talbot, of the Cargo Fleet Iron Co., Ltd., Middlesbrough, England, of a tilting open-hearth furnace of 400 to 500 tons capacity. This incorporates a reservoir wherein the finished steel may be held for a time, Mr. Talbot contending, it may be added, that prompt teeming is destructive of quality. Mr. Reynders looks for profitable meetings also from the conferences in view of the American disposition to engage in frank interchange of experiences.

Dr. Herbert M. Boylston, of the Case School of Technology and president of the Ohio section of the institute, in an introductory address, traced briefly the history of the open-hearth furnace, dwelling on the fact that it is only 60 to 65 years old, having been invented by William Siemens in 1858. Though originally applied to secure regenerative action in manufacturing zinc, glass, and for heating crucibles, it was later employed for working wrought iron, requiring a temperature of 2700 deg. and, of course, promptly damaging the roof. Passing briefly over the difficulties of convincing the engineering public of the value of the process, he told of its introduction in a locomotive plant in 1868 at Crewe, England, and in the same year at the Cooper Hewett plant at Trenton, N. J. Whereas in 1878, ten years later, 32,000 tons of open-hearth steel were made in this country, there were 65 tons of Bessemer made for every 3 tons of open-hearth steel. In 1895 the manufacture of open-hearth steel began making rapid strides, catching up with Bessemer production in 1907.

G. D. Tranter, American Rolling Mill Co., Middletown, Ohio, chairman of the open-hearth superintendents' committee, reviewed briefly the organization and objects of the committee. Questions and problems it is likely to consider include such items as the following: material, size and shape of brick; specifications of ingot molds; standardization of furnace design for given conditions; economic value of various grades of scrap and specifications for them; recommended practice for various grades for steel; fuel consumption; furnace repair and maintenance and introduction of labor saving devices.

To the committee on furnace design, of which Kent Harrison is chairman, J. W. Galvin, of the Wheeling Steel Corporation, and L. E. Yost, of the McKinney Steel Co., Cleveland, were added.

R. L. Leventry was made chairman of the committee on practice and yield and these additions were made to it: C. B. Collingwood, superintendent of open-hearth and rolling mill, Stanley Works, New Britain, Conn.; Carl W. Peirce, open-hearth superintendent, Mansfield Sheet & Tin Plate Co., Mansfield, Ohio; J. L. Schueler, metallurgist, Keystone Steel & Wire Co., Peoria, Ill.; James J. Bowden, chief metallurgist, Laclede Steel Co., Alton, Ill.

To the committee on refractories were added E. L. Ramsay, Wisconsin Steel Co.; George D. Walters, Atlantic Steel Co., Atlanta, Ga., and Ernest A. Smith,

open-hearth superintendent, Andrews Steel Co., Newport, Ky.

Mr. Bowden was made secretary of the open-hearth superintendents' committee, which will hold its next meeting in April, 1926, possibly in Chicago, and which may be responsible for a session of the meeting in February in New York of the American Institute of Mining and Metallurgical Engineers.

Proportions and Performance of Gas Burning Furnace

TO start discussion on furnace design, Kenneth McCutcheon, American Rolling Mill Co., Ashland, Ky., described a furnace at his plant using natural gas. It was rated at 75 tons, with a 38 ft. by 15 ft. 6 in. hearth, or 5.89 sq. ft. per ton for 100 tons output and 7.85 sq. ft. per ton on the basis of the original rating of 75 tons. It is 66 ft. by 17 ft. 9 in. between buck stays, which are 15-in. channels. The furnace top may be described as of the camel back type, with a radius of curvature both lengthwise and crosswise. There is a 20-in. spring to the arch front to back. The port opening has an area of 18 sq. ft. and is 6 ft. 9 in. wide and 36 in. high. The length of the port to the well is 6 ft. 9 in., and the slope of the port floor is 2¼ in. per ft., and the slope of the port roof, 4¾ in. per ft. The bridge wall is 10½ in. high, and 13½ in. thick. The area of the well is 38.8 sq. ft. There is a divided slag pocket, the gas pocket being 4 ft. 6 in. wide and the air pocket 5 ft. 3 in. wide, and both 16 ft. 3 in. long. The furnace is intended to use producer gas if necessary. The area of openings to the fan tail are 17 sq. ft. for the gas and 31¼ sq. ft. for the air, and that of the openings to the checker chambers, 21 sq. ft. for the gas and 31 sq. ft. for the air.

The checker chambers are 27 ft. long and 13½ ft. high, with a width of 6 ft. 10½ in. for the gas and 15 ft. 1½ in. for the air. The total number of checkers is 36,600, made up of 4½ by 4½ by 10½ in. brick and equivalent to 76,000 9-in. brick. The amount of surface exposed and the number of cubic feet of brick are here tabulated. On the basis of 100 tons output, there are 44.6 cu. ft. of brick per ton, and on a basis of 75 tons, 59.5 cu. ft. Similarly, the area exposed is 410 per ton for 100 tons rating, but 547 sq. ft. for 75 tons. The bricks are laid in domino fashion giving 6-in. flues. The area of the main flues at the valves is 15 sq. ft. for the gas, and 21.4 sq. ft. for the air, while the area of the flue to the stack, which is 5 ft. 9 in. in diameter and 160 ft. high, is 15¾ sq. ft. In passing Mr. McCutcheon mentioned that a loss of 1 in. water pressure was found through the valves.

Proportions of Brick Work for Checker Chambers

	Gas	Air	Total
No. of checkers (both ends)	11,600	25,000	36,600
Square feet exposed	12,800	28,000	41,000
Cubic feet brick	1,392	3,068	4,460
Square feet flues	110	265	375

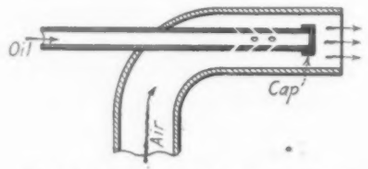
The consumption of fuel runs from 4500 to 6000 cu. ft. of natural gas per ton, and the heat equivalent corresponds to over 6 million B.t.u. An average of 256 heats are obtained in campaigns producing ingot iron, but it takes about 2 hr. more, according to Mr. McCutcheon, to get out the equivalent in ingot iron as compared with steel. It was claimed that the furnace would show a performance of 100 more heats in making steel than in making ingot iron. He agreed that a furnace may often be run too long from the economic standpoint of the furnace itself, taking into account such items as the state of the checkers, but an uncertain demand may make it unwise to put into operation a fresh furnace which may show higher economy itself but have only a short campaign due to the state of the steel market.

Performance With Oil Burning Furnace

James J. Bowden, chief metallurgist of the Laclede Steel Co., Alton, Ill., similarly described an oil burning furnace producing 75-ton heats, with a consumption of 40 gal. of oil per ton, with oil having a calorific value of 19,500 B.t.u. per gallon. The number of heats per month ranged from 55 to 63 and he claimed 400 to 450 heats as the life of the roof, with a record run of 530 heats. He said that 180 to 185 heats were obtained for the back wall. About twice a week this was daubed up with chrome ore together with Syndolag. For the front wall, 200 to 250 heats were mentioned as the performance. The slag pockets are cleaned out every 100 heats, and about 15 in. are taken out at a time.

The ladle performance used to be 12 heats. For lining the ladles, a cement gun now is used applying crushed brick and fire clay, and this has increased the number of heats per ladle to 18. The mixture for the cement gun is one-third clay and two-thirds crushed brick, applied immediately after every heat with a coating of perhaps ⅛ in. in thickness. Oil at 150 to 175 lb. per sq. in. pressure is used, with steam at 125 lb. pressure for atomization. By using a steam separator he secured an increased speed of working the steel and reduction in amount of fuel, the fuel reduction amounting, he estimated, to 15 to 20c. a ton. He suggested in passing that he was likely to investigate the performance of the checkers by means of pyrometers to ascertain the duration of time in which the checkers show efficient storage of heat.

Among other things brought out in the discussion a type of oil burner was described and offered as an unpatented device. The accompanying sketch will help to indicate its general features. In this, air is used for the atomizing at 80 lb. pressure, while the oil is supplied at 90 lb. The end of the ⅜-in. oil pipe is capped and there are eight ⅛-in. holes drilled at the angle against the flow of air, so that the oil on being forced into the air pipe meets the opposing current of air with resultant atomizing and mixing.



The Oil in This Burner Is Forced through Inclined Holes in the Oil Pipe, Which Is Capped at the End

James R. Stuart, open hearth superintendent of the Colorado Fuel & Iron Co., Pueblo, Colo., described a superheater for use in burning tar. This amounted to nothing more than 13 ft. of 2-in. pipe bent into return bends to lie over the checker brickwork. Superheating the steam to 400 and 500 deg., the consumption of tar per ton of steel was reduced from 40 to 43 gal. to 32. The pipe is bled through a ⅜-in. opening, so that when the burner is inactive, the pipe will not get so hot as to burn out.

The question of single versus double slag pockets in connection with oil burning was brought up, and R. L. Kane, open hearth superintendent, Bourne-Fuller Co., Cleveland, found that with the double pockets the oil consumption was cut 4 to 5 gal. per ton.

The use of metal cased brick in the ends of a furnace was discussed at some length. In spite of warping, it was possible to reclaim 75 per cent of the brick, putting the parts end to end. Laid dry, it was pointed out that good performance was obtained by using six courses of the 13-in. brick and then a course of chrome brick laid flat, or 2½ in.

Special Back Wall Construction

Back wall construction was discussed, partly in the light of the Nasmyth patents employed by the Illinois Steel Co. By bending the buck stays and building the wall inclining outward, a furnace in the upper level is widened 26 in., being stepped back by means of plain brick and the ramping of 3 in. of magnesite burned in. The maintenance is a matter of the use of dolomite. A record of 1300 heats, it is claimed, shows that repairs have amounted to substantially nothing. The back

wall lies against a ¾-in. plate. The back skewback is 6 in. lower than that in front. With a combination of Danforth checkers, a venturi arrangement of ports, an 18-in. roof constructed with 22-in. ribs and the back wall described, it was stated that with 13½ furnaces 98,000 tons of steel was made in a recent month.

One of the furnaces of the open hearth plant of the Republic Iron & Steel Co. visited on Monday preceding the meeting in Cleveland showed an inclined back wall employing steel plate against which is built up above the slag line a refractory lining of chrome rock.

Increases in Furnace Ratings

In respect to the increased output now generally obtained per furnace in terms of the original furnace rating, it was pointed out how the war demand had resulted in cutting off 2 ft. at each end, at least where oil or tar was used instead of gas. For example, Carl W. Peirce, Mansfield Sheet & Tin Plate Co., Mansfield, Ohio, told what was done with a furnace with a 15 by 35-ft. hearth. The port to the end wall measured 12 ft. By cutting off 2 ft. at each end, the bath was lengthened to 39 ft. He and others admitted that it was not a good practice altogether to take off lining, as there is a considerable chance of thinness in spots. In his case, the depth from slag line to the bottom was 24 in.

Another mentioned the case of a depth of 24 in. to 27 in. for a 100-ton furnace. At the Bourne-Fuller plant, a furnace rated at 50 tons has produced 85 tons. To the contention that depth of bath should possibly be limited in terms of the time of refining, it was pointed out that a 200-ton furnace works on a 40-in. depth of bath, and that a limiting depth has not necessarily been reached. At the Weirton plant, the bath depth is 28 in.

Out of the discussion came a proposal for members to supply photostats of their exemplary furnace designs. This could be compiled at headquarters, and thus each member be given a book combining conveniently photostats of furnaces of various sizes and constructions adapted to different kinds of work and different kinds of fuel.

Variations in Charging Practice and Yield

AS regards charging practice a considerable number explained their procedure. A. W. Smith, works superintendent Youngstown Sheet & Tube Co., found a good quality of product, having in mind apparently the sheet-bar, by using molten iron to the extent of 40 to 42 per cent of the charge. A 45 to 46 per cent iron charge was satisfactory, when a small amount of ore was used. When the iron amounts to 50 per cent, the process is slowed down. Charging time is 4 to 5 hr. Limestone amounts to 10 per cent and no heavy melting scrap is used, but instead uncut flashings and compressed sheets. For patching, the experience of the Youngstown plant with a cement gun was not satisfactory. There was a tendency for the phosphorus to increase, and it was thought this might be due to the ground brick used.

The Youngstown Sheet & Tube practice in making rimming steel 0.10, 0.11 and 0.12 per cent carbon for sheet bars, say in 100-ton heats, involves the use of 40 per cent iron, some of it charged cold to the amount of 20,000 to 30,000 lb. Deoxidizers are sometimes used. Using aluminum 10 lb. is the amount and titanium 150 to 200 lb. per 100 tons. Skulls weigh 2500 to 5000 lb. The yield from ingot to the cold finished bar is 83 to 84 per cent after rejections are taken out. For a good sheet surface, 0.11 to 0.13 carbon and 0.50 manganese is preferred. In the rimming the steel rises sometimes 3 or 4 or even 5 in. in 22x24-in. ingots.

Consumption of Ingot Molds

The American Rolling Mill practice at Middletown, Ohio, is to use 19x20-in. ingot molds for rimming steel and 18x20-in. Gathmann molds for killed steel. In the latter a graphite wash is used and hot tops. The life of the molds is 95 heats and of the stools 300 heats. Stripping is begun 20 min. after the last of the rimming steel is teemed, and 2 hr. in the case of high carbon steel.

Mold consumption amounts to 32 lb. per ton and stool consumption 5 lb. per ton, the latter figure being obtained by noting the annual replacement in terms of the annual production of steel. A plate about 17½ in. square of No. 14 gage is used on the stool for the 18x20-in. mold and is not floated or lost in the bottom but may be seen when the ingot is turned over. A clay wash is found not good and lime gives a scum-like surface. The company's experience is in favor of light rather than heavy stools.

The Republic company's experience is 100 heats for 20x24-in. molds and 60 for 18x32-in. slab molds. An increase to 60 in the latter case was the result of pickling the walls of the mold. The consumption in pounds is 40 of molds and stools per ton of product.

The Sharon Steel Hoop Co. finds a loss of 26 lb. of 20x22-in. molds per ton; the Wisconsin Steel Co., 28 to 30 lb. of 18x20-in. molds.

At the Donner plant the molds stand 75 heats. They comprise 20x20-in. Gathmann, 23x26-in. and 21½x21½ in. The consumption amounts to 25 to 30 lb. per ton. Tar is used on the hot stool and tar around the top of the mold. A spraying of graphite and aluminum has been tried but not sufficiently long for the results to be learned.

At the Colorado Fuel & Iron Co. plant, 80 to 85 heats are obtained, though this was admitted as keeping the molds in service perhaps too long. The company makes its own molds.

The Youngstown Sheet & Tube experience is 32 lb. of molds for the shop average. The mold sizes are 20 x 22 in., 16 x 32 in., 18 x 32 in. and 19 x 46 in., the last showing a life of 60 heats. The use of graphite in the smallest mold has helped to increase mold life and better the surface.

About 110 heats and 32 lb. per ton were the figures given for the Laclede records. About 22 lb. for ordinary and 36 lb. for the Gathmann molds were given for the Bourne-Fuller experience.

The yield from ingot to sheet bar is 84 per cent at the Sharon Steel Hoop plant, 82 per cent after inspection at the shipping car at the Republic plant and 84 per cent at Inland Steel Co.

J. L. Schueler, metallurgist Keystone Steel & Wire Co., Peoria, Ill., said that theoretical yield at the Keystone plant was 89.69 per cent on an average cold charge, with 93.51 per cent on the actual weighing of the ingots. This is based on 13-hr. heats, whereas with a poorer charge the calculated yield is 88.85 per cent and actually 87.77, and 15 hours' time in the furnace. With a charge of 38 per cent pig iron and cast iron, the yield is 91 per cent, and lime used, 10.32 per cent. In this case 6000 tons are obtained per month, whereas with 100 per cent scrap, the output is 4500 to 5000 tons. The yield, he pointed out, depends in part as to whether clean or rusty scrap is used, or light or heavy scrap; also the temperature of pouring and the amount of limestone. No special trouble has been experienced from the ash content of coke used for obtaining carbon. Coke breeze has been used, but any analyzing more than 0.75 per cent sulphur is rejected. Otherwise, there seems to be no necessity for demanding metallurgical coke.

Accounting for Pit Scrap in Charge

One point made in the question of yield was that the figure varied widely, according to the way pit scrap, for example, is charged. In most cases, apparently, the pit scrap is regarded as 85 per cent metal, and being somewhat nearer 100 per cent, helps the yield to that extent. The ore charged is measured in terms of its iron content, whereas pig iron is regarded as 100 per cent metal. The practice evidently has arisen from the fact that the iron is bought at so much a ton, whereas ore, for example, has a price dependent on the iron content.

The need was pointed out of establishing a recommended practice for calculating the yield, or in other

words, for defining procedure so that the percentage of yield, for example, may mean the same thing in all plants. Pursuing the point further, it was explained that some add 1 or 2 per cent to allow for kish, while others deduct for the kish. Some included ingot butts in the pit scrap. Allowances for the pit scrap charged into the furnace ranged from 2 per cent to 5 per cent, the latter case being one half pit scrap proper and one half butts. In some cases the pit scrap is weighed, and in others it is not, and there was no general conclusion as to how best to insure the prompt cleaning up of the pit scrap after every heat.

Size of Skulls

In the matter of yields, the figures ranged from 87 to 90 per cent. It was pointed out that the estimates of the pit men for the amount of pit scrap, ladle skulls, etc., were usually one-half or even less than one-half of the actual weight. Mr. Tranter said that at his plant they had a chart for getting the weights of skulls for given heights and thickness.

This brought up the question of the thinness of skull, showing that some like to be sure of the desired pouring temperature by having a large rather than a small skull, while others try by tapping on the cold side to get as little skull in the ladle as possible. One member preferred a 2500 to 3000-lb. skull to a clean ladle, with the surety that the steel would not pour too hot and therefore there would be no scabs on the steel.

Mr. Peirce pointed to the carbon, manganese and silicon contents as having fully as much influence on the ladle skull in teeming rimming steel as the temperature. With silicon 0.015 per cent, both carbon and manganese must be kept low, the manganese say at 0.35 per cent or as nearly 0.30 as possible and not so high as 0.40. In the Mansfield plant 96-ton heats are teemed into bottom cast ingots and 8 to 10 lb. of aluminum is used. The view was general as to the proper temperature of the molds themselves that one should be able just to bear the hand on them. If the mold is too hot there is a tendency to form blow holes and if too cold, moisture may be present.

Using Reducing Flame Too Seldom

As further emphasizing that the human equation has a bearing fully as important as the temperature attained within the furnace before tapping, Mr. Peirce recounted an experience some ten years ago at the Lackawanna plant making rail steel. The investigation covered the records with 1500 to 1600 heats over a period of seven months. One furnace was in the hands of unusually good first helpers. Another was operated in the successive shifts by first helpers who strove for high temperature, forcing the gas and keeping an oxidizing flame rather than one of reducing character. In the case of the first there were six perfect rail heats, then one developing one condemned rail, then three more perfect heats, whereas with the output of the second furnace there were 15 per cent of seconds with successive irregularities. There was six times as many rail seconds, and of 92 heats over 10 per cent were seconds.

Mr. Peirce's point included an assertion that differences among first helpers were not usually recognized, and also that while efforts are made to keep sulphur and phosphorus low, too little thought is paid to the troubles from oxygen. He called attention to the fact that oxygen will combine with steel at all temperatures and remaining in the ingot is conducive to the formation of blowholes and slag inclusions. He doubted the stress given to temperature at the end of a run and held that it was not necessary to tap so as to get skulls.

In discussing the making of bottoms, Mr. Peirce advocated taking time to wash out the furnace when the bottom is "bad," before rabbling. Sometimes this procedure takes 12 hours, but he regarded it important to have no steel remaining, for without steel the repairs will suffice for a month's run. Mr. Tranter mentioned that their practice is to blow out with air, directing the air toward the tap hole. Mr. Harrison found warrant for taking 30 min. to 1 hr. for washing after every heat, a matter of special importance in making special steels, as is done at the Donner plant.

The Ladle Nozzle

Using the cement gun for ladle lining was claimed to give 50 heats, in one experience. At Pueblo, the performance is 20 to 25 heats. A shale brick is used. Cutting the ladle nozzle from 1¾ to 1½ in. cut down the number of heats per ladle on the average to 13. An unusually thin lining is used in this plant, and now a 2-in. nozzle is employed and the steel is teemed into 21 x 21-in. molds, reducing materially the time in which the steel is in the ladle.

The topic led to discussing the prompt knocking out of the old nozzle from the hot ladle. Kent Harrison, Donner Steel Co., Buffalo, described the method followed by the Maryland Steel Co. when duplexing was introduced. The ladle was laid on its side immediately after teeming. A bar was placed across the lugs, and then what may be described as a long pole was shoved into the nozzle opening carrying a bell or stopper of the nozzle shape. Mud of clay or ganister was thrown in and the nozzle well was shaped and the new refractory bottom dried in 2 hr.

R. L. Leventry, Republic Iron & Steel Co., explained that they had been similarly setting stoppers for three years. At one time, 10 furnaces were cared for in 24 hr. by four ladles. The arrangement has saved two men per turn. Just to see what could be done, a nozzle has been set, he said, in 3 min. from the time the slag was dumped from the ladle. The average nozzle renewal takes 20 min.

What Iron Does Open-Hearth Department Desire?

As to the composition of pig iron desired for making mild steel, there were various views. Out of the discussion came the suggestion that the open-hearth man might well be more stringent in respect to his requirements. He ought not be left in the position of making a product on which he is held to strict accountability when he has so little to say as to what the blast furnace department gives him. The thought was expressed by L. B. Lindemuth that possibly a committee might be appointed to make recommendations to the blast furnace department in respect to the most desirable pig iron for a given open-hearth operation.

Among the opinions offered as to the best pig iron for the purpose were these: Silicon of 0.90 to 1.25 per cent and manganese of 1.50 to 2. Another of 1.00 to 1.25 manganese. Another, 1.50 per cent manganese. A fourth put the manganese at 2 per cent and silicon from 0.70 or 0.80 to 1.10 or 1.15, working the steel for 0.37 per cent residual manganese and cutting the amount of ferromanganese in two, or 500 lb. against 850 to 900 lb. in a 0.08 to 0.12 per cent carbon heat teeming 96 tons; in this case the charge of 245,000 lb. is made up of 25 per cent scrap, 59 to 60 per cent scrap plus borings and 7 to 8 per cent lime. Still another opinion was iron of 0.90 to 1.25 silicon and 1.25 to 1.50 manganese, using 2500 lb. of spiegeleisen of 5½ per cent manganese and 2 per cent silicon to 100-ton heats 20 min. before tapping. It was pointed out that in securing molten iron high in silicon from the blast furnaces, one is getting a high physical temperature, that is high sensible heat, and one contention was that the desirable thing is an analysis providing for high graphitic carbon.

Refractory Session Discusses Dolomite Clinker

A LARGE part of the session devoted to refractories was taken up by a talk by M. E. Holmes, of the U. S. Bureau of Mines. G. V. Bole, the Bureau of Mines, Columbus, Ohio, chairman of the committee on refractories, was scheduled for a paper but was unable to be present because of illness. E. A. Whitworth, chairman of the meeting, announced before adjournment that the various problems touched on will probably be

discussed in considerably more detail at the next meeting of the committee in Chicago, next April, and in the meantime a questionnaire on refractories will be sent out.

Mr. Holmes read a statement from Mr. Bole, which pointed out among other things that the Bureau of Mines has spent much time and money on refractory problems, that it now has five men at work and is anxious to cooperate with the open-hearth committee. Mr. Holmes then told how the bureau is working on the use of dolomite for brick—much of this research being in connection with brick for open-hearth furnaces. Dead burnt dolomite might be suitable for brick but not for patch work clinkers. Clinkers for patch work should be stable, so that they will stand up during transportation and be in the same condition when used as when made. Fuel consumption, he said, is less if stable clinker is used.

Clinker for Patch Work

Clinkers on the market are not stable but flake down in several months. They vary in silica content from 3.02 to 6.77 per cent and there is quite a range in their content of iron oxide and alumina. The Bureau of Mines, he said, has gone into the subject of clinker in much detail. It has found that the silica content must be above a certain per cent to make sure the clinker is stable. The silica content must be 9 per cent on a clinker basis and from 5 to 12 per cent on a raw basis to make sure that the clinker is stable. The content of iron oxide and alumina is not so important.

Even if the clinker is stable it will be unsatisfactory in the open-hearth furnace unless it resists corrosion. Corrosion of clinker is one of the problems being worked on by the Bureau of Mines. All clinkers now on the market corrode. Corrosion, he said, is due to various causes, including over-heating, cuts in the fluxing stone and reaction of the lining in the slag. But a more important question is whether the silica or iron in the slag is a cause of corrosion. Silica is probably an active agent of corrosion on the bank of the hearth.

There are two types of corrosion, one at the bank and the other at the bottom of the hearth and these may be due to two causes. It is the general opinion that high silica clinker results in rapid corrosion. If this is true, it seems due to the reduction of the iron oxide in the clinker. The speaker did not know whether clinker can be developed that can stand corrosion better than the clinker that is now on the market. He outlined some of the laboratory tests for corrosion made by the Bureau of Mines and said that the work would be continued on a semi-commercial basis and hoped that it would be possible to improve patch work clinkers. Tests to determine the cause of corrosion will also be continued.

Another question that should be considered is whether it is desirable to standardize patchwork clinker. As there are five uses for clinker, another matter that should be considered in this connection is whether there should be five clinkers, one for each use. Flux clinker is being tested for use instead of stone in lining and in patching. Although this clinker costs six times as much as raw stone, it may be found to be more economical. Another question is whether the flux should be in one form or in different sizes and whether coarse flux should be used on bottoms and fine flux on the banks. These, in his opinion, were matters on which users and manufacturers can get together.

In the discussion G. D. Tranter, American Rolling Mill Co., said that his company is experimenting with dolomite clinker and is getting good results. The iron oxide has a fluxing action on the sides but he believed the cutting action on the bottom was mechanical. Several others expressed the opinion that burnt dolomite clinker is better than the raw stone.

There was some discussion of the matter of turning the ladle brick to make it true. Mr. Whitworth remarked that turning worked well in foundry practice and should work well in open-hearth operations.

Standardizing Silica Brick Sizes

Another subject discussed was the standardization of silica brick sizes. G. G. Coolidge, Harbison-Walker Refractories Co., said that the American Refractories Institute had gone over the blueprints and had reduced the number of shapes from 146 to 106. He pointed out that the use of standardized roof brick for open-hearth furnaces has become more general. However, it would be impossible to reduce the number to very few shapes. At present there are 33,000 clay shapes and 18,000 silica shapes. Manufacturers of refractories would welcome any standardization that could be accomplished.

Mr. McDonald, General Refractories Co., said that there had not been enough cooperation between refractory makers and users and that the open-hearth committee should cooperate with the refractory institute. Mr. Tranter expressed the opinion that brick will be more standardized when open-hearth design becomes better standardized. He pointed out the importance of standardization from a standpoint of inventory. Mr. Whitworth remarked that open-hearth superintendents desired to cut down on the number of brick sizes.

There is some discussion of the size of ladle sleeves and nozzles. R. L. Leventry, Republic Iron & Steel Co., said that his company is using 5-in. sleeves and 2-in. nozzles. Mr. Tranter stated that the American Rolling Mill Co. is using 5½-in. sleeves and 2-in. nozzles and J. H. Carter, Sharon Steel Hoop Co., stated that he is using 5-in. sleeves and 2¼-in. nozzles.

Some of the open-hearth superintendents stated that they had used California magnesite for patch work and had found it as good as Australian magnesite. Mr. Leventry said that he had used chrome for two years as a first course in front and back walls of furnaces and found that it lasted as long as magnesite brick. He also had used chrome rock for the same purpose in the back walls.

Foundry Equipment Discussed at Boston

BOSTON, Oct. 16.—H. M. Lane, president H. M. Lane Co., Detroit, was the chief speaker at the October meeting of the New England Foundrymen's Association, held Wednesday evening. His talk, which was accompanied by lantern slides, was devoted to foundry equipment, its merits and shortcomings, and was confined to a considerable extent to some of the largest automobile plants.

Mr. Lane asserted that a foundry might have the best equipment obtainable, yet be inefficient unless the equipment is sold, so to speak, to the plant organization. He stated that roughly a traveling crane does not pay unless a plant has a daily volume of not less than 30 tons. The upkeep of locomotive cranes is high, according to Mr. Lane. He mentioned cases of steel mills having five such cranes in order that three may always be available. No crane, he declared, is yet provided for proper locking when idle. Numerous cranes, he explained, have blown from rails.

After discussing various kinds of charging equipment, Mr. Lane showed the application of old style wheelbarrows, as used by the International Harvester Co., simply to prove that existing equipment about a foundry often can be used to advantage. A concrete mixer used in a brass foundry as a wet tumbling barrel also was illustrated to demonstrate how makeshift machinery is sometimes economical.

H. P. Blumenauer, Arcade Malleable Iron Co., Worcester, Mass., vice-president of the association, gave an outline of coming activities. Vincent T. Malcolm, metallurgical engineer, Chapman Valve Co., Springfield, Mass., will talk on the application of the X-ray study of foundry casting defects at the November meeting. At the December meeting, A. A. Grubb, technical department, Ohio Brass Co., Mansfield, Ohio, will talk on the technical control in the foundry as an aid to the foundrymen. His talk will embrace gray iron as well as brass. The January, or annual, meeting will take the form of a past-president's night. R. F. Harrington, Hunt-Spiller Mfg. Corporation, South Boston, president of the association, presided at the meeting.

SIDE GUIDE AND GRIPPER

Testing Society Committees to Meet in Cleveland

Some of the leading committees of the American Society for Testing Materials and certain joint committees are to hold a three-day session for group meetings at the Hotel Cleveland, Oct. 27 to 29. Some of the committees and the sub-committees which will assemble are the following:

A-1 on steel.
A-2 on wrought iron.
A-4 on heat treatment of iron and steel.
A-5 on corrosion of iron and steel.
A-7 on malleable castings.
B-2 on non-ferrous metals and alloys.
B-3 on corrosion of non-ferrous metals and alloys.
C-8 on refractories.
D-5 on coal and coke.
Committee on electrical metallic resistance materials for high temperature work (in course of organization).
Research committee on the effect of tin on tool steel.
Joint research committee on effect of temperature on the properties of metals.

This is the third meeting of this nature, the first having been held in Washington in the fall of 1924 and the second in Philadelphia in March this year.

Adopts Plan for Bidding on Structural Steel

The Structural Steel Board of Trade of New York City, having decided some time ago to put into effect on Nov. 1 a lump sum method of bidding on structural steel contracts, has worked out the plan for bringing this new situation into effect. The plan was developed by a committee consisting of three structural steel engineers and three structural steel fabricators and is embodied in a resolution which was adopted at a meeting of the Structural Steel Board of Trade on Oct. 13, in part as follows:

1. That all plans be prepared according to the best engineering practice showing all labor and material of the various classifications required and specifying the conditions under which the work is to be performed.

2. That all plans shall show a complete design, with sizes, sections, and relative location of the various members, with floor levels, column centers, and offsets figured, and shall also show the character of the work to be performed with sufficient dimensions to permit the making of an accurate estimate. Plans to be made to scale not less than ⅛ in. to the foot and large enough to convey the information adequately.

3. That wind bracing and special details when required shall be shown in sufficient detail regarding rivets and construction to permit an accurate estimate of the cost.

4. That specifications shall definitely enumerate all the items to be included in the estimate, and, in all respects not covered by the specifications, the code of standard practice of the American Institute of Steel Construction shall govern.

5. That inspection be called for in specifications under "Inspection." That amount of money to be included be specified, and that the inspector be appointed by the engineer.

COMING MEETINGS

October

American Welding Society. Oct. 21, 22 and 23. Fall meeting, Massachusetts Institute of Technology, Cambridge, Mass. M. M. Kelly, 33 West Thirty-ninth Street, New York, secretary.

American Iron and Steel Institute. Oct. 23. Twenty-eighth general meeting, Hotel Commodore, New York. E. A. S. Clarke, 40 Rector Street, New York, secretary.

November

American Institute of Steel Construction. Nov. 11 to 14. Annual convention, White Sulphur Springs, W. Va. Charles F. Abbott, 350 Madison Avenue, New York, executive director.

National Founders Association. Nov. 18 and 19. Twenty-ninth annual convention, Hotel Astor, New York. J. M. Taylor, 29 South LaSalle Street, Chicago, executive secretary.

American Society of Mechanical Engineers. Nov. 30 to Dec. 3. Annual meeting, Engineering Societies Building, 29 West Thirty-ninth Street, New York. Calvin W. Rice, 29 West Thirty-ninth Street, New York, secretary.

National Exposition of Power and Mechanical Engineering. Nov. 30 to Dec. 5. Grand Central Palace, New York. Charles F. Roth, International Exposition Co., Grand Central Palace, New York, manager.

Pushing Movement for Museum of Engineering and Industry

Dr. Oskar von Miller, director of the Deutsches Museum, at Munich, Germany, is planning a visit to the United States, reaching this country from Mexico about Oct. 28. It is expected that he will be made the guest of honor on at least one occasion in New York or Chicago in the interest of the National Museum of Engineering and Industry.

The movement to establish the national museum, with a center probably at Washington and branch museums in the principal industrial cities of the country, is under the leadership of Samuel Insull, long conspicuous with the Commonwealth Edison Co., Chicago. The definite educational and practical benefit of the museum in Munich is regarded as giving special importance to the advice, information and encouragement to be obtained from Dr. Miller. The national museum has headquarters in the Engineering Societies Building, New York, and an active campaign for membership is under way, fostered by the national engineering societies, and every effort will doubtless shortly be made to secure broad attention to the movement.

Electrochemists Adopt Society Pin

A society pin was adopted by the American Electrochemical Society at its fall meeting in Chattanooga, Tenn., last month. It was based on the best of over 100 suggestions submitted to a special committee. The pin is a circular shield with the details in design brought out in black and gold, against a lilac background. The center field is occupied by a Weston standard cell and an arc playing between horizontal electrodes, symbolizing electrolytic and electrothermic reactions respectively. The name of the society is inscribed in gold in the border of the shield.

The spring meeting of the society will be held at the Chicago Beach Hotel, Chicago, April 22, 23 and 24.

Copper Association Elects Officers

The Copper and Brass Research Association has elected the following officers: President, R. L. Agassiz, Calumet & Hecla Consolidated Copper Co.; vice-presidents, C. F. Kelley, Anaconda Copper Mining Co.; F. S. Chase, Chase Companies, Inc.; Walter Douglas, Phelps Dodge Corporation; H. J. Rowland, Rome Brass & Copper Co.; U. T. Hungerford, U. T. Hungerford Brass & Copper Co.; treasurer, Stephen Birch; secretary, George A. Sloan; manager, William A. Willis.

"Coal Mining Investigations," under the auspices of the Carnegie Institute of Technology, the U. S. Bureau of Mines and the Advisory Board of Coal Mine Operators and Engineers, has recently been issued by the institute. The authors are F. E. Cash of the Bureau of Mines, and E. H. Johnson, of the Carnegie Institute.

The Steel Club of Philadelphia has elected the following officers: President, S. J. Cotsworth; vice-president, Frank W. Jones; secretary-treasurer, Frank J. Krouse; directors, L. R. Stewart and Charles McKinley.

Non-Ferrous Foundry Metallurgy*

Melting Furnaces, Aluminum Alloys and Other Subjects Discussed by Institute of Metals and Foundrymen

DESPITE the miserable weather at the Syracuse convention of the American Foundrymen's Association, Oct. 5 to 9, the meetings devoted to non-ferrous metallurgy were well attended. Three such programs were held under the joint auspices of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers and the American Foundrymen's Association. The latter organization also conducted a most interesting round table discussion of brass foundry problems—a luncheon meeting which lasted until four o'clock.

Melting Furnaces

"Some Refractory Problems in the Non-Ferrous Electric Furnace Casting Shop" was the title of a paper read by G. F. Hughes, superintendent of casting, Bridgeport Brass Co., Bridgeport, Conn. He stated that two years ago the main problem recognized was the development of a refractory cement to resist the action of pure copper and high copper alloys. It appeared that if this problem could be solved, it would also mean that the same cement would give better results on yellow brass.

In the intervening time much has been done. Whereas campaigns in the Ajax-Wyatt furnace (2500-lb. charges) would rarely reach 600,000 lb. metal per lining, 700,000 lb. of 98:2 Cu:Sn is now the rule. This has been done by cooperation with the refractory manufacturers in the production of a cement with a minimum shrinkage, high vitrefaction point and high strength at working temperature. The latter two apparently are mutually contradictory, so a balance must be struck.

It has also been found that a chromium base lining is best for brass. Life of the lining is also increased by "balanced" ramming—two men working opposite each other simultaneously—by increasing the power applied, and by careful drying and preheating.

High-Frequency Induction Furnace

Dudley Willcox of the Ajax Electrothermic Corporation, Trenton, N. J., described some recent developments in a "New High-Frequency Induction Furnace." The principles of this furnace were developed some years ago by Dr. Northrup of Princeton University. It is essentially an air transformer using currents of high frequency, wherein the metal bath is the secondary circuit. It is able to develop extremely high temperatures and about 3000 kw. capacity has been installed, principally to melt special electrical alloys. Its chief commercial drawback has been the high cost of the frequency converters. It is now possible to build simple crucible furnaces, suitable for brass melting, with rotary converters as a source of electrical energy. This has reduced the price materially.

New Non-Ferrous Melting System

"An Atomized System of Non-Ferrous Melting" was described by R. Black and C. L. Shafer of the Gibraltar Bronze Co., Cincinnati. Atomized coal is distinguished from pulverized coal by its fineness. Atomized coal is ground through 200 mesh in a tumbling barrel, using rods for abrasives. It is then burned in an ordinary crucible furnace by feeding a constant quantity into a fan exhaust.

Discussion

Several claims for this patented system were contested by Mr. Romanoff, Ohio Brass Co., Mansfield, Ohio. He felt that the good record for melting time was due to a good furnace design rather than to the fineness of the coal. The paper also stated that atomized coal is non-explosive because methane is driven off in the drier. Mr. Romanoff said that the exhaust from their coal driers had been repeatedly analyzed for methane, with negative results. Even if all methane was extracted, the Bureau of Mines has proven "coal dust" (anything finer than 100 mesh) to be explosive over quite a range of air mixtures, even when the dusty air is free from gas. It was also doubted whether the soundness and density of the Gibraltar Bronze Co.'s product was due so much to the fuel used as to the clean metal charged, melted and poured at the proper temperature into molds having proper gates and risers.

Temperature Control

It seems to be the consensus of opinion that accurate temperature control of the metal at the time of pouring is one of the prime essentials of successful brass founding. Consequently an animated discussion on the best methods of measuring this temperature followed the reading of a paper by R. L. Binney, Bunting Brass & Bronze Co., Toledo, and was resumed at the round-table luncheon.

After some six years investigation of various pyrometric systems and indicating instruments, Mr. Binney writes in his paper that he is still looking for a good pyrometer. However, in his presentation he said that in their foundry they are using heavy bare base-metal wires, open ended for the hot element, connected permanently to a potentiometer (so as to insure a constant external resistance). First the potentiometer is set at a figure near the metal temperature, the metal is skimmed and vigorously stirred. Meanwhile the thermocouple ends have been heated to a red heat, and then are immersed about 3 inches in the clean melt. Within a few seconds the potentiometer will give the temperature of the surface of the metal. In order to protect the instrument, and yet be portable, it is "underslung" on a baby-carriage chassis.

Discussion

G. K. Elliott, Lunkenheimer Co., Cincinnati, commenting on Mr. Binney's remarks on the difficulty of getting temperatures of metal in the furnace, said he had fairly good results by using an optical pyrometer. First the furnace fuel must be shut off, and the fumes blown out momentarily with the blast. A quick sight on the clear metal will approximate black-body conditions, and check a thermocouple closely.

H. M. St. John, chief metallurgist, Detroit Lubricator Co., Detroit, agreed that an open end thermocouple was the best. He uses wires of ⅛ to ¼ in. diameter. After stirring the metal carefully, the ends are dipped 3 in. below the surface. In 10 seconds they acquire the temperature of the bath at that point, and if the wires are then withdrawn until just submerged, a momentary reading will give the temperature of the ends of the couple. In this way very consistent results are had. Four hundred readings are taken daily; four meters are used, and the elements must be remade after 100 readings. Each meter and couple is checked against a standard every day. The readings are all taken by pyrometer tenders, who become quite expert in the manipulation and in the readings.

G. Jensen and H. F. Seifert of the Westinghouse company, East Pittsburgh, agreed that the ends of the thermocouples and the surface of the metal should both be free from slag. They thought that the size of wire and whether or not the ends should be twisted depend

*Crowded out of the convention report of the American Foundrymen's Association in THE IRON AGE, Oct. 15.

upon the kind of alloy being poured. At any rate, bare wire is necessary for the prompt observations necessary.

Aluminum Alloys

The most animated discussion during the aluminum meeting followed J. B. Chaffe, Jr.'s paper on "Permanent Mold Aluminum Castings." The author is with the Permold Co., Cleveland. He pointed out that such castings were poured by hand into warm metal molds, much as a bearing is babbitted. For successful work, the solidification shrinkage of 5 to 7 per cent must be taken care of. This is done by so designing the mold that the metal will freeze progressively toward the gates and sprues, which remain liquid to the last.

To start work, the mold is warmed to 700 deg. with a gas flame. The rate of casting is then maintained so that this temperature remains constant. If the mold gets too hot, surface defects appear on the castings; if too cold, the thin sections will not fill. Such fast work means hot work so that strong artificial ventilation must be provided the operators.

Owing to the smaller fluctuations in temperature, the permanent mold has a longer life than the die for die casting under pressure. Dies are usually of special cast iron. They warp much less than steel, but have a tendency to chip at the corners. Small 2-cavity dies have given 250,000 pieces each; on the other hand, a long die for a casting 2 ft. long developed a 0.005 in. warp after 6000 castings, and needed re-facing. No surface cracks were developed, however.

Steel cores are used. A very important part of the work is the withdrawal of these cores at just the right instant. Sticking is rarely noticed; it may be corrected by a wash of lime and sodium silicate. This, however, mars the finish. The accuracy of permanent mold castings is very good. It can easily be held to $\mp$ 0.0010 in. This requires machining for interchangeable parts, but is close enough so each casting jigs perfectly. Machining can also be done with impunity, for the metal is sound throughout, free from blowholes.

About one million permanent mold aluminum castings are now made monthly. The daily production on a vacuum cleaner motor housing is about 400 to 450 per day.

Aluminum Aircraft Castings

"Aircraft Castings in Aluminum Alloys" were described in two papers by Samuel Daniels and D. M. Warner of the Army Air Service, Dayton, Ohio. Six alloys are regularly used for casting purposes. Their composition, properties and uses are summarized below:

Al:Cu—92:8—usually known as "No. 12," is the most common, and is used for lightly stressed parts such as housings and brackets. It is easy to cast and machine, and its manipulation is well known to many foundries. It is not heat treated, and standard test bars in the cast condition will test 21,000—1.0—60 (ultimate strength, elongation, and Brinell at 500 kg. respectively).

Al:Cu:Fe:Mg—88.5:10:1.25:0.25—is used for sand and chill castings requiring hardness and strength at 500 deg. Fahr., such as pistons, manifolds and bearings. It machines better, but is more brittle than the first mentioned. Sand cast bars test 25,000—1.0—80, and it can be heat treated to 37,000—0.5—120.

Al:Cu:Fe:Mg—95.75:2.5:1.25:0.5 — will develop good strength and shock resistance without heat treatment, and is used for guides, levers and mountings. It machines well. Sand cast bars test 23,000—3.5 (minimum specification).

Al:Cu:Si—94:5:1—is a proprietary alloy, is much superior in strength and shock resistance to No. 12 and is used in crankcases, rocker-boxes, cylinder heads and water-jackets. It is difficult to pour into large or complicated castings. As cast it develops 21,000—3.5—60; but after a correct heat treatment may easily attain 35,000—8.0—70. A separate paper was presented giving the results of an extended study of this alloy.

Al:Cu:Si—93:4:3—is the best of all aluminum casting alloys. It does not crack during shrinkage, nor warp at changing sections. Such parts as camshaft housing, super charger castings and intake manifolds are made of it. Sand cast test bars develop 21,500—2.0—55.

Al:Cu:Ni:Mg—92.5:4:2:1.5—(developed in England under the name "Y" alloy) is employed for pistons, cylinder heads and bearings as a substitute for the second alloy mentioned. It is melted under cover and poured into shallow gates. Chills are used to prevent sponginess in heavy sections. It can be made very sound and to withstand 600 lb. water pressure. As sand cast the alloy develops 26,000—0.5—80 and after heat treatment 36,000—0.5—95.

The paper also gives notes on the preparation of the alloys and the hardness, the specifications for the test bars, and the tests and methods of inspection used by the Army Air Service.

French Exchange Paper

The title of the exchange paper with the French Foundrymen's Association is "Some Notes on the Founding of Light Alloys." It is written by R. de Fleury, of Paris. To his mind iron is a most important impurity to control if successful castings are to be made, and therefore he condemns the use of iron melting pots or high-iron ingots. He also lists the alloys commonly used in France as follows:

88:12 Al:Cu for pistons.
87:3:10 Al:Cu:Zn for general casting purposes.
88:7:5 Al:Cu:Zn.
92:8 Al:Cu.
97.5:2.5 Al:Cu for stamping.

Large quantities of modified aluminum-silicon alloys ("alpax") are also used.

The paper goes on to discuss the solidification shrinkage of these alloys and the influence of these properties on the methods of gating, temperature of casting, use of chills and permanent molds and of die casting.

Theoretical Metallurgy

Two papers on the "Fatigue of Non-Ferrous Metals" were presented, one by Prof. H. F. Moore, University of Illinois, and another by D. J. McAdam, Jr., Naval Engineering Experiment Station, Annapolis. Mr. McAdam has replotted some of the endurance tests on monel metal and duralumin obtained at Illinois and at McCook field and finds in some instances that the curves drawn in a mean position do not correspond to curves derived at Annapolis. Mr. McAdam thinks that all metals so far tested show definite evidences of an endurance limit—that is, a stress which will not break the specimen no matter how often repeated. Mr. Moore thinks the experimental results so far obtained do not indicate where this endurance limit will be found in monel metal and duralumin.

It is unfortunate that the two laboratories in controversy did not have samples of the same metal. Nor do they use the same style of testing machine. E. E. Thum, Linde Air Products Co., New York, in discussion, said that the very concept of rigidity connoted the ability to resist a certain load without permanent deformation or damage. On this basis, common sense indicated that all metals—in fact all solid bodies—must have endurance limits. It is only a question of pushing the experiments far enough to find them. He also thought that many of the differences existing between Messrs. Moore and McAdam rested upon the way each one plotted a curve to represent average results of some scattering data. Since everyone knows how greatly the personal equation affects such work, contradictory conclusions drawn therefrom are not surprising.

Francis B. Foley presented a brief paper on "Amorphous Cement in the Light of X-ray Evidence." It is a highly compacted excursion into the realm of speculative metallurgy, and deals with the mechanism of solidification, crystal building, and the formation of metallic compounds—many of them points of great importance to the non-ferrous metallurgist. The paper is incapable of being abstracted, but is packed full of suggestive ideas.

The Keystone Steel & Wire Co., Peoria, Ill., has filed a complaint with the Interstate Commerce Commission against the fifth class rate of 26c per 100-lb. on wire products from Peoria to Indianapolis and asks for reparations on shipments made at that rate, together with the establishment of what the commission may consider a reasonable rate.

THREADS BY BROACHING

Special Rig on Standard Machine Increases Output—Thread Broaching Also Done on Lathe

MANY difficult internal machining operations have been accomplished with more accuracy and with marked saving of time by the use of broaching machines in place of other types, broaching being commonly employed for operations formerly done on slotters, shapers, milling machines, drilling and reaming or lapping machines, internal gear cutting machines, etc. An interesting example of the application of the process to work formerly done on a lathe is the broaching of a splined driving nut for an aeroplane starting motor, employed at the Hoboken, N. J., plant of the Eclipse Machine Co., Elmira, N. Y. At this plant, also, the broaching principle has been applied to a lathe.

In the first of these operations, the broaching of a splined driving nut for an aeroplane starting motor, chrome nickel steel is used for the sleeve or nut on the outside of which are straight splines machined by means of a hobbing machine. In the broaching operation these splines are utilized to hold the work from turning in the work-holder. The broaching job consists of cutting a left-hand quadruple thread in the splined sleeve. The lead of the thread is 6.800 in., the pitch 1.700 in., and there are 0.147 threads per inch.

The machine on which the broaching operation is performed is an ordinary type of commercial broaching machine to which has been added the special driving rig shown in Fig. 1, to rotate the work against the straight pull of the machine. On both sides of a cast hood, mounted on the end of the broaching machine as shown, are gears proportioned to rotate the work-holder and work in proper relation to the longitudinal travel of the broach through the work, thus securing the proper lead. There are eight gears in the train, driven from the head end of the machine by a shaft extending from one end of the machine to the other under the cross-head guide casting. The special broach employed was developed and made by the company. It incorporates the lead of the thread, so that as it is pulled straight back by the machine, with the work rotating at proper rate against it, the thread desired is cut in the nut.

In applying the broaching principle to the lathe, a lathe having the lead screw geared to feed the carriage as for thread cutting is employed to push a broach through the work. A quadruple thread of 0.1905 in. pitch, 1.750 threads per inch is broached in an automobile starter pinion, which may be seen in the illustration of the set up for this job, Fig. 2. A special tool holder is mounted on the lathe carriage as shown.

The action of the broach may be summed up as follows: The lands of the broach may be considered to replace four settings of the work which would be necessary to produce the quadruple thread with a single-point lathe tool. The various cutting steps in each land may be likened to the many individual cuts needed to cut each thread to proper depth. The broaching method on this work combines four settings and many cuts for each setting into one pass of the tool through the work.

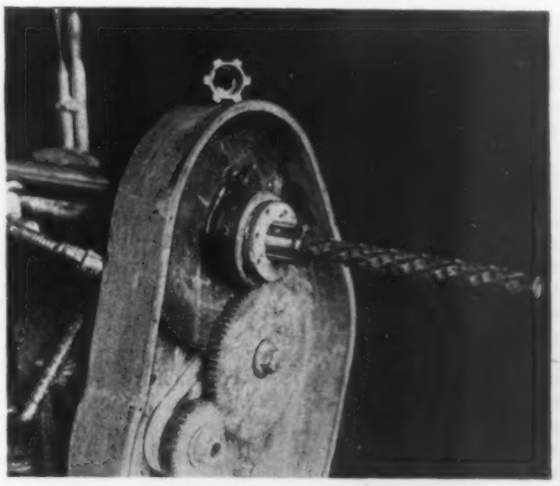


Fig. 2—A Lathe Having the Lead Screw Geared to Feed the Carriage as for Thread Cutting Is Employed to Push a Broach Through the Work. The work is shown at the base of the special tool holder (right)

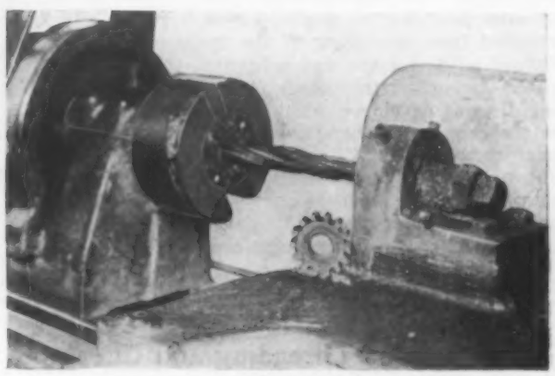


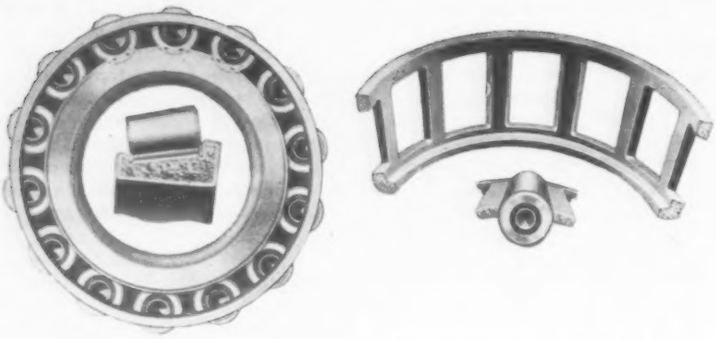
Fig. 1—A Train of Gears Driven from the Head End of the Broaching Machine Turns the Work Holder at a Rate Which Produces the Desired Lead as the Broach Is Pulled Through the Work. The work is shown on top of the housing for the gears (left)

Refinements in Design of Timken Bearing

Changes in the design of roll, cone and cage have been embodied in a new type of tapered roller bearing by the Timken Roller Bearing Co., Canton, Ohio. At the same time, a nickel-molybdenum steel of special formula has been adopted, which is said to increase the life of the bearings.

The alterations in design are not radical but rather are major refinements. The design of the roll has been changed so that the surface of the large end presents a right angle relation to the center line of the roll. The contact then between the large end of the roll and the rib of the cone is in two areas, the rib of the cone being slightly undercut. This two-area contact is intended to assure proper axial alinement between the center line of the roll and the center line of the bearing at all times. Likewise there is always line contact between the surface of the roll and the surface of the cone, and between the surface of the roll and the surface of the cup.

An added purpose served by the two-area contact is self-alinement of rolls on cone, in the cup without resorting to a cage fixture to retain the alinement. The primary purpose served by the cage is to retain the rolls, properly spaced about the cone, and to make the cone with its set of rollers a unit assembly. The



Improved Tapered Roller Bearing. Nickel-molybdenum steel has been adopted and the design of the rolls changed so that the large end is at right angles to the center line of the roll. Among other refinements, the lateral edges of the cage are swaged inward, so that the contour of the sides of the cage pocket conforms to contour of the roll

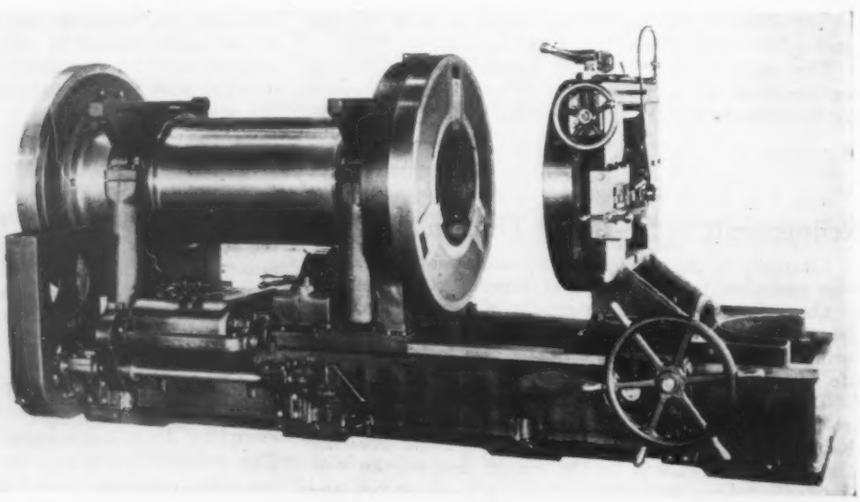
skewing of the roll on the cone raceway is prevented, since the two areas on the end of the roll make generously separated points of contact with the shoulder or rib of the cone, as shown in the illustration.

The cage has been improved along with the cone and roller assembly. Previously, the cage was cold pressed into the shape of a cup, the bottom stamped out and the pockets for the rolls punched out, one at a time, by an automatic punch press. The result of this single stamping operation was positive uniformity of cage pockets; yet a progressive error in alinement resulted from stretching of the metal, as the indexing fixture advanced the metal cage to the final perforation. To correct this small error, a multiple perforating die was developed which perforates all roll pockets in the cage, by a single impact. To further safeguard against the possibility of error during this operation, due to distortion, an inwardly turned flange has been retained on the smaller side of the cage. To insure smoothness and a proper fit of the rollers in the cage the lateral edges of the cage are swedged inward so that the contour of the sides of the cage pocket conforms to the contour of the roll. This operation is termed "winging." Dies similar to the multiple perforator are used, so that all cage pockets are winged simultaneously. The inwardly turned flange and the result of the winging operation are shown above.

The improved type of bearing, it is said, has reduced the coefficient of friction materially. To obtain a definite uniform standard of quietness the Timken company has developed a sound testing machine which measures the noise in a running bearing by means of an electric current. A sounding box connected with a telephone receiver, and a set of radio tubes, carry the amplified noise vibrations of a running bearing to a galvanometer connected with an arbitrarily indexed dial. The human element is removed, and the noise is registered with unfailing accuracy on the dial where it can be read by the operator. By the use of the machine, it is said, it is possible to select bearings to a set standard suitable for the most quiet applications, as well as to locate the cause of the noise.

Machine for Threading and Cutting Large Pipe

Only one die head is required for all pipe sizes on a 20-in. duplex pipe threading and cutting machine which is a recent development of the Bignall & Keeler Machine Works of the N. O. Nelson Mfg. Co., Edwardsville, Ill. No special tools are necessary for changing dies, which are of the Peerless type, skip tooth, 3 7/16 in. wide, 12 pieces per set, with curved eccentric relief. The machine is provided with tools for cutting off, reaming and beveling pipe. It will handle 10 to 20-in. pipe. A three-jaw independent chuck is provided on each end of the arbor. The rear chuck has flange grippers for making up or breaking down flanged fittings; the front chuck is close to the housing and bolted securely to the master gear. The lubricating system includes a reversible geared oil pump with suitable piping and control valves insuring a plentiful supply of cutting oil. The machine is driven by means of a single pulley, and speed changes are obtained through steel gears running in oil in a compact gear box, which is integral with the bed of the machine. Motor drive may be used by mounting a 10-hp. constant speed motor above and connecting through reducing gear and silent chain.



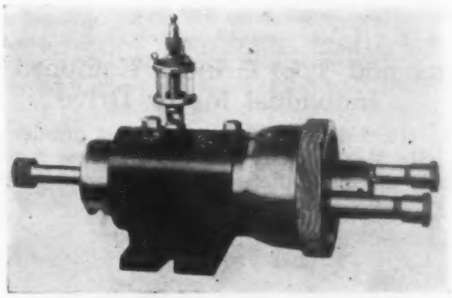
Duplex Pipe Threading and Cutting Machine with Capacity for Pipe Ranging from 10 to 20 In. in Diameter. Only one die head is required for all pipe sizes and special tools are unnecessary for changing dies

NEW GRINDING SPINDLE

Air Turbine Driven Device for Small Hole Grinding Equipped with Governor Control

An air turbine driven internal grinding spindle equipped with governor control, and adapted for grinding holes ranging from ¼ to 1 in. in diameter, the speed being maintained at a predetermined rate regardless of whether the grinding wheel is cutting or the spindle is idling between cuts, has been added to the line of the Ex-Cell-O Tool & Mfg. Co., 1469 East Grand Boulevard, Detroit.

The governor operates through the medium of an electrically-controlled relay and solenoid-operated valve, the governor mechanism being a simple pair of electrical contacts which are controlled by the speed of the spindle. An adjustable idling valve maintains the speed at the rate desired when the wheel is not cutting. The governor contacts are then adjusted so that additional air is admitted to the spindle when the wheel begins to cut, and the spindle speed is reduced only slightly below the idling speed. All parts of the governor mechanism including the relay and solenoid-operated valve are so designed that wear is minimized, it being claimed that these parts will remain operative indefinitely. Delicate adjustments are not required. Electrical energy is not consumed except while the grinding wheel is cutting and the cost of electricity is said not to exceed 1 or 2c. per 8 hr. operation.



Governor Control Is an Outstanding Feature. The speed is maintained at a predetermined rate both when the wheel is cutting and when the spindle is idling between cuts

The spindle is designed for continuous operation at speeds up to 30,000 r.p.m. It is stated that with air pressure of 80 lb. per sq. in. the air turbine motor will develop rated speed when idling between cuts with an air consumption of less than 12½ cu. ft. free air per min. The air consumption under cutting conditions will vary according to the diameter and face of the grinding wheel, depth of feed and material being ground. The increase in air consumption while the cut is actually in progress may not be in excess of 25 or 100 per cent of the consumption when idling, although if the rapid removal of extra large amounts of stock is required the turbine motor can be made to deliver as much power as can be used by the grinding wheel by further increasing the air consumption.

As the turbine has only one simple rotating element this can be given accurate running balance. The absence of vibration is claimed to permit of high finish on the work being ground and also to materially increase the life of grinding wheels. The higher speed provided, together with absence of vibration also permits of using softer grinding wheels. Among other advantages of the governor-controlled air turbine driven spindle, the absence of belts and elimination of belt expense is stressed, and it is claimed that the life of the spindle bearings is lengthened because they are not required to carry the belt load, vibration due to belts being also eliminated. It is pointed out that the first cost and the maintainance expense of countershafts or spindle driving motor is eliminated.

The spindle is equipped with the company's XLO high-speed controlled ball bearing, patents for which have been applied for. This design is said to permit the bearing to operate at high speeds continuously for long periods without developing looseness and without requiring adjustment or attention other than routine oiling. As in the smaller non-automatic speed control spindles, the exhaust air is circulated around the bearings to keep them cool.

This spindle is applicable also for hob, thread and worm grinding, center grinding, male and female, and the driving of high-speed diamond cutting tools. The spindle nose is provided with an internal taper and thread to take removable wheel quills of various lengths, chucks for holding solid stick or pencil stones, steel insert pencil wheels, known as mounted points because of the abrasive being molded and baked in place on a steel stem and other tools.

Pyrometers with Electric Automatic Compensation

Temperature fluctuations of thermocouple cold junctions are compensated electrically by an automatic device exhibited by Wilson-Maeulen Co., 383 Concord Avenue, New York, at the National Steel Exposition in Cleveland. A source of error in pyrometer installations is eliminated and thermostats, water-cooled cold junctions, or buried cold junction wells are no longer necessary.

Tapalog Recording Pyrometer (Left) with Automatic Electric Compensator

Indicating Pyrometer and Switch with Automatic Electric Compensator, the Correction Being Exterior to the Instrument

The automatic electric compensator employs a Wheatstone bridge connected in the thermocouple circuit. Three sections of this bridge are resistances composed of materials of constant resistance; the fourth is of material which alters in resistance in response to temperature changes, thus altering the current from a dry cell connected to the Wheatstone bridge. This temperature responsive coil and the thermocouple cold junction are both located at the in-

strument panel, where both are subject to the same temperature changes.

This method electrically corrects the thermocouple current, is entirely independent of the instrument, and does not involve mechanical or electrical movement or correction inside the instrument. For this reason it permits convenient checking of instruments. The accuracy of compensation attained by this compensator is based on the precision with which the resistances composing it can be commercially manufactured and on the exactitude of resistance changes (and therefore current corrections) in response to temperature change.

Instruments of various ranges, if for the same type of thermocouple, can be interchanged on the same compensator. It can be applied to double-range instruments by using two compensators, one for each range. When indicating and recording pyrometers are used in combination, one automatic electric compensator is sufficient for both indicator and recorder, since the correction is made in the thermocouple current, and not in the instrument.

Installation of pyrometer equipment is simplified, for the wiring and connection of the compensator is done on the instrument panel at the factory, and the purchaser has only to run a pair of extension leads from each thermocouple to his instrument panel and make connections there. In installing equipment the user need not be concerned with theories of compensation, or ways and means of stabilizing the temperature of the cold junction. Practically all the pyrometer equipment now being installed by Wilson-Maeulen Co. is equipped with this type of compensator.

Double-Spindle Disk Grinder for Small Work

In announcing the 10-in. double-spindle disk grinder illustrated, the Gardner Machine Co., Beloit, Wis., stresses the saving in initial investment, power, abrasive disk expense and floor space permitted by a machine designed specifically to handle light, small parts as compared with a machine carrying 18- to 20-in. disk wheels usually used for the same work. The machine, designated as the No. 77, is intended for the grinding of a variety of small pieces having opposite sides of approximately equal area, its capacity being for parts from ½ to 1½ in. in diameter or outside measurement, and from 3/32 to 3 in. in thickness or length. The work may be presented to the grinding disk by hand or automatically.

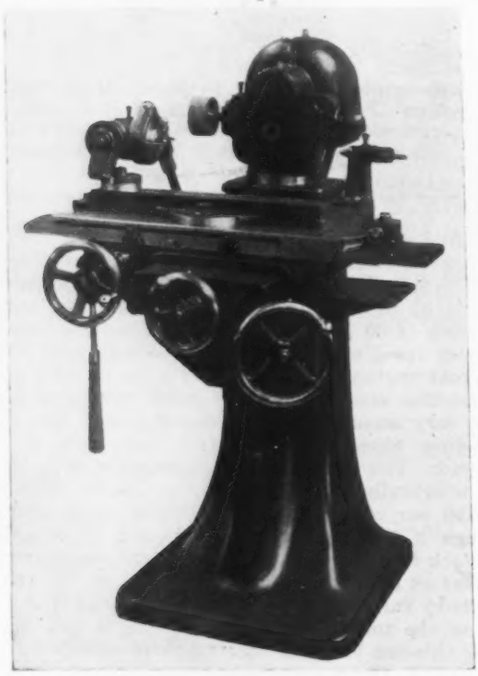
Ten-Inch Disk Wheels Are Used and the Capacity Is for Work Ranging from 1/2 to 1½ In. in Diameter and 3/32 to 3 In. in Thickness or Length

Bench or floor type machines are available, the latter, here illustrated, being designed particularly for motor drive. Each spindle is driven by belt from two separate motors in the base, the belt from each motor being provided with a belt tightening device. The motors are ventilated through screened openings in the base.

The machine carries 10-in. diameter disk wheels faced with the company's heavy type G. I. A. disks, or 8 in. x 1 in. x 6 in. abrasive ring wheels mounted in shallow chucks of the straight-back type. The grinding heads are mounted on dovetailed slides which are protected from dust and dirt, and movement of the heads is accomplished by means of a hand-lever arranged to give a leverage ratio of 12 to 1. Micrometer adjustment is provided. The spindles are mounted in radial and thrust ball bearings. The wheel dressing device is carried on the top of the hinged hood, which is an integral part of the machine, and is operated through a rack and pinion by means of the large handwheel. The weight of the floor type machine is 1225 lb., and of the bench type, 650 lb.

Cutter and Tool Grinder Equipped with Individual Motor Drive

The No. 2 universal cutter and tool grinder of the Oesterlein Machine Co., Cincinnati, a new feature of which is the application of individual motor drive, is shown in the accompanying illustration. The machine is of the "knee and column" construction, using planer type table and saddle bearings.



The Motor Drives the Wheel Spindle Through a Flexible Coupling and a Pair of Spiral Gears. The wheel spindle head may be swiveled in its base and locked

The motor, mounted on the wheel head, is inclosed and drives the wheel spindle through a flexible coupling and a pair of spiral gears, the driven gear being

mounted directly on the spindle. Ball bearings are used throughout the head, there being two on the driving gear and four on the spindle. The spiral gears run in oil. Any standard 1800-r.p.m., ¾-hp. motor may be used to drive the machine. The wheel spindle head may be swiveled on its graduated base to 90 deg. in either direction, and may be locked in any position. With this arrangement a plain wheel may be used for cylindrical grinding, and the wheel spindle placed at right angles to the table and a cup wheel employed for cutter and tool grinding. A spring plunger is provided to lock the spindle when changing wheels.

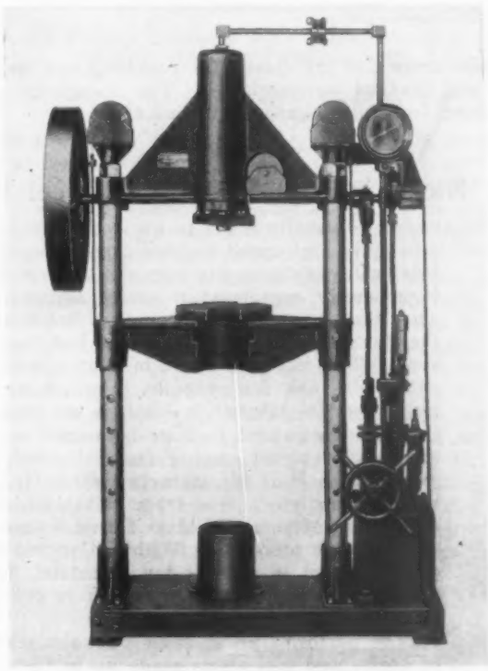
The universal headstock is driven through a flexible shaft, one end of which connects to the rear end of the motor. The other end connects through a jaw clutch to a worm and worm wheel, mounted in a housing on the headstock. A lever for operating the jaw clutch is mounted on the worm wheel housing. By removing two screws the worm wheel housing on the universal headstock may be released and the entire housing lifted off for the grinding of small cutters and reamers.

Reciprocation of the table may be obtained by the hand wheel which is arranged with two gear ratios, or by a lever that may be connected to the reciprocating mechanism at a point most convenient for the operator. The equipment used on belt driven machines may be used also on the machine illustrated and any belt driven No. 2 machine now in use may be changed over to the individual motor drive.

15-Ton Hydraulic Press

Rapid operation is a feature of a 15-ton press known as the Hydropress, which has been added to the line of the McCall Machine Works, Rochester, N. Y. It is intended for production work or for use on any of numerous jobs around the shop, such as pressing gears and pulley on and off shafts, straightening shafts, push broaching or pressing bushings into motor housings.

The cylinder is of steel and has U leather packing and a removable gland. The ram, of steel, is 4 in. in diameter and has a travel of 15 in. Return of the ram is effected by springs. The strain bars are 3 in. in diameter and are drilled accurately so that when the pins are inserted, the resistance beam is kept square with the ram. The beam is a steel casting machined on the top surface and has a turret with different openings. It is counterbalanced by heavy springs to facilitate hand movement up and down. The base is a steel channel.

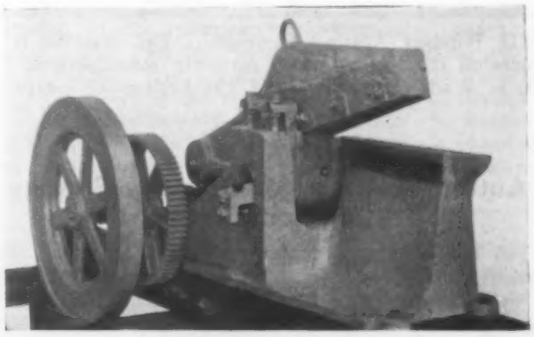


The Base May Be Extended at the Left for Mounting Motor. The gage indicates pressure in lb. per sq. in., or in tons

The machine is equipped with a two-stage pump, the larger plunger serving to move the ram rapidly to the work. The liquid is then bypassed to the water box, while the smaller plunger raises the pressure as desired. A bronze safety valve, which is adjustable for various pressures, is provided to prevent overloading the press. A gage to indicate the pressure in lb. per sq. in., as well as tons on the ram, is also furnished. The distance between strain bars in 26 in., and from the ram to the resistance beam, or daylight, is 10 to 34 in. With motor mounted on extended base, the floor space occupied by the machine is 1½ by 5 ft. The height overall is 6½ ft. and the weight 1100 lb. net.

Wear on Shear Taken Up by Wedge Device

A wear adjustment wedge, placed on the shear housing opposite the cutting side, is a new feature of design recently adopted by Doelger & Kirsten, manufacturers of shears, Milwaukee, Wis. The housings on which the wedge is attached have been made thicker and higher. The wedge is placed next to the housing and between the wedge and the jaw is a phosphor bronze plate. Should wear occur at this point, the operator needs only to loosen two lock nuts and the take up on the top nuts, thus driving the wedge in and taking up the wear. If the bronze plate wears it can readily be replaced by a new one. Between the jaw and the shear frame on the opposite or knife side of the frame is also a bronze plate, which is likewise renewable in case of wear. A wedge is placed only on the one side of the shear, one reason being that having the wedges on both sides would interfere with the cutting of long sheets.



The Wedge Is Placed on the Shear Housing Opposite the Cutting Side

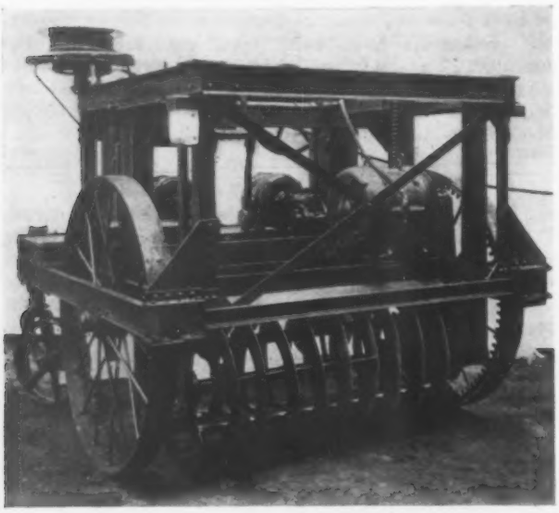
Ryerson Co. Takes Over Harnischfeger Drilling and Boring Machines

Rights covering the line of horizontal drilling and boring machines manufactured and sold for many years by the Harnischfeger Corporation, Milwaukee, have been acquired by Joseph T. Ryerson & Sons, Inc., Chicago. The machines are intended for the drilling, tapping, boring and facing of large, bulky pieces. Two types of the machine are available, one being of the two-column type with outboard bearing, and the other a self-contained unit, either stationary or portable. They may be furnished in a variety of sizes and arranged for direct-connected motor drive.

ELECTRIC SAND CUTTER

Machine with Four Motors Takes Current Through Constant-Tension Cable

A sand cutting machine electrically operated has been brought out by the Production Equipment Co., 5213 Windsor Avenue, Cleveland. The machine is a redesign of a sand cutter formerly manufactured by H. L. Wadsworth, Cleveland, the Production company having taken over the Wadsworth patents. Important features claimed for the new machine are its ruggedness, speed and ease of operation.



Flexible Design of Sand Cutter Taking Power Through an Electric Cable

It has a spiral cutting cylinder approximately 35 in. in diameter. This cylinder is driven by a slow-speed motor through a chain, both the motor and chain being totally inclosed. The cylinder is counterbalanced with weights, raising and lowering of the entire cutting mechanism being done by means of a hand wheel on the operator's platform.

Each wheel is driven by a multi-speed motor from which the power is transmitted through a worm and gear directly to gears on the inside of the driving wheels. The driving mechanism is totally inclosed and each motor can be operated independently. The drive has drum type controllers and the operator can steer the machine through the control levers.

Power is supplied through a stranded cable, constant tension being maintained through a torque motor that takes up the slack in the cable. The tension on the cable can be adjusted by a patented electric controlling device connected to the motor. The operator's platform is at the front, giving him a clear view of the work.

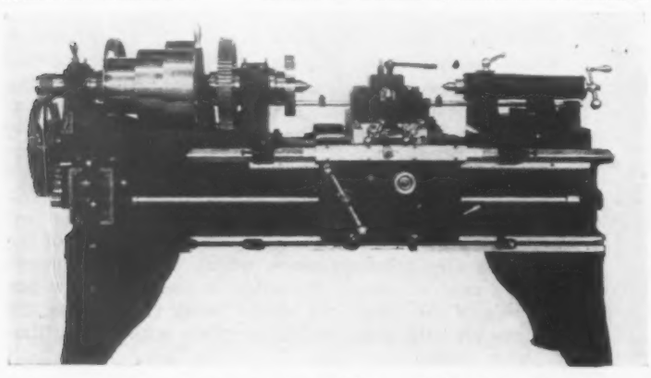
Small caster wheels at the front are connected to the frame through an equalizing beam to take up the unevenness of the floor. If the cylinder hits a casting or other obstruction, the shock is transmitted directly to the cutting cylinder motor, it is pointed out, and is absorbed electrically, reducing the danger of breaking the transmission.

The machine is made in two models, with cutting cylinders 40 to 84 in. wide. The smaller model, with cylinders 45 to 60 in. wide, differs from the larger in that the raising and lowering of the cutting cylinders is accomplished through a patented device by means of which the motor acts as a counterbalance for the cutting cylinder.

Automatic Lathe for Quantity Turning of Short Work

A special automatic lathe designed primarily for use in turning short work, either straight or taper, on a production basis, is here illustrated.

The machine is a development of the Rahn-Larmon Co., Cincinnati, and can be furnished in the 18 or 20 in. swing with double or single cross-slide for either one or two tools, for roughing or finishing operations.



One Tool Can Be Set for Roughing and Feed in One Direction and the Second Tool for Finishing in the Opposite Direction

As shown above, the apron and carriage are arranged with automatic feed for either direction. The first tool can be set for roughing and feed in one direction, and the second tool set for finishing to feed in the opposite direction. When the roughing is completed, the apron automatically reverses and the finishing cut is taken.

The lathe can be furnished either with or without taper attachment. The head stock is provided with friction drive and the speeds for roughing and finishing are changed automatically. The roughing and finishing feeds also change automatically.

Nickel in High-Speed Tool Steel

An attempt is usually made to avoid the introduction of nickel into high-speed tool steels, although cobalt, which is chemically very similar to nickel, is generally considered a useful addition to such steels, says a technical news bulletin of the Bureau of Standards. This is just the reverse of the situation found in alloy steels for automotive use, for example, in which nickel plays a useful role, while cobalt is not used.

Some high-speed tool steels contain small amounts of nickel coming from the melting stock used. It is increasingly difficult to secure melting stock free from nickel, because of the use of scrap in blast furnaces and in steel-making processes. With the prevalence of alloy steel in present-day industrial uses, any lot of scrap is almost certain to contain some nickel steel.

The performance in taking roughing cuts of high-speed tool steels made up in the laboratory, to which relatively large amounts of nickel were intentionally added, was studied at the bureau. Three and a half per cent nickel in the low tungsten or high tungsten types of high-speed steel was found to have no injurious effect upon the life of the tool. With the normal carbon content, however, the machining qualities of the annealed steel were adversely affected, the steels being almost impossible to machine. Tools formed by grinding gave good performance.

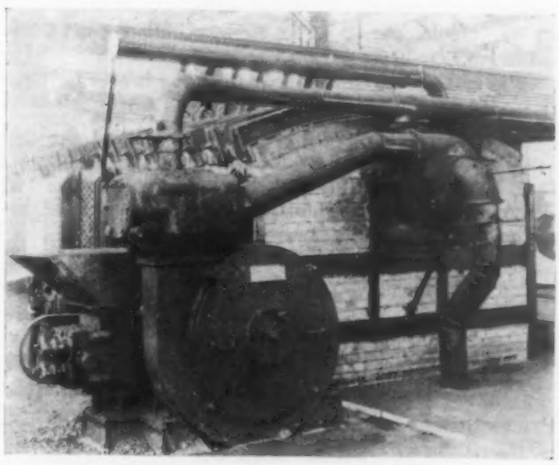
By reducing the carbon content from 0.70 to 0.50 per cent the steel which contained 3.50 per cent of nickel could be machined and showed normal performance in roughing cuts. These experiments indicate

that small amounts of nickel in a high-speed tool steel, the carbon content of which is properly regulated, should exert no deleterious effect.

This work was a part of the study of the effect of nickel, cobalt, tantalum and molybdenum in high-speed tool steel.

Pulverizer Removes Slate, Stone and Other Impurities from Coal

A unit pulverizer recently installed at the plant of the Belle City Malleable Iron Co., Racine, Wis., is arranged to remove slate, stone and other foreign material from coal, thereby permitting the use of a cheaper



A Three-Stage Grinder Has Been Provided to Assure Uniform Pulverization

grade of coal and also, it is said, insuring the production of better and more uniform metal in the air furnace. From a receiving hopper, shown on the left in the illustration, coal is drawn by suction up an incline into a grinding chamber visible in the foreground. The suction is sufficient to convey the coal up the incline, but heavier materials, such as slate and stone, drop through an opening in the duct. It is this arrangement for separating impurities from coal which is one of the most important features of the pulverizer.

A three-stage grinder has been provided to insure uniformity of pulverization. The rotating grinding element is also equipped with vanes which at once suck in the coal and blow the pulverized product into a distribution chamber above, whence it goes to the burner at the end of the air furnace. The capacity of the machine is 2000 lb. of pulverized coal per hr. The pulverizer is known as the Vulcan and was originated and designed by A. A. Wickland & Co., Chicago.

Adds 48-In. Planer to Line

The Cincinnati Planer Co., Cincinnati, has added a 48-in. machine to its line of Hypro planers which were described in THE IRON AGE of April 2. Selective dial feed is provided for each head, a turn of the knob giving the range of feeds from zero to 1 in. A safety device prevents accidents when feeding both rail heads toward the center, and a safety trigger gear has been placed on the rail and side heads. The rail is clamped to the inside face of the housing by means of a device operated by a single turn of a crank handle at the end of the cross rail. Rapid traverse is provided to both the rail and side heads, the mechanism being arranged so that the heads can be moved in any direction independently of each other or they can be engaged at the same time. Centralized control is a feature, and positive lubrication of all moving parts has been provided.

Handling Over 365 Tons per Day in a Foundry

Handling of 733,407 lb. of materials a day by three men and two electric hoists in its foundry is reported by a large machinery manufacturer. A single molding machine gives an output of 22,000 lb. of good castings a day, this large production being made possible by efficient handling with the hoists. In turning out this tonnage, patterns, flasks, molds, ladles and castings must be lifted, moved and lowered, frequently with hair-line precision, as in lowering the cope on the drag, and heavy and dangerous loads must be carried, often with only a small clearance. Two 3-ton "Lo-Hed" hoists, each carried by the simplest form of traveling crane, are the entire material-handling equipment of this foundry. Although constantly exposed to fumes and dust, these two hoists keep production moving in an unbroken stream.

Direct Reading Micrometer

A micrometer equipped with dials from which the size of the piece being measured may be read directly has been placed on the market by the Brown & Sharpe Mfg. Co., Providence. Time is saved by the device because it eliminates the necessity of figuring from graduation lines, the direct reading feature reducing also the chance for error in reading. The figures are large and exact sizes in thousandths of an inch may be read at a glance from any angle.

Particular attention has been given to the construction of the indexing mechanism, steel indexing gears having been incorporated to assure good wearing qualities and smooth action. Simple means for adjustment of the measuring screw are provided; when necessary to compensate for wear of the measuring screw a cap on the end of the thimble is removed and the adjusting nut made accessible through an

The Direct-Reading Feature Saves Time in Measuring and Reduces Chance of Error

opening in the thimble. This construction will be recognized as advantageous, as it is unnecessary to disassemble the tool or return it to the makers for adjustment. This micrometer, designated as the No. 26, may be held and operated conveniently with one hand.

To Give Course on Hygiene for Welfare Managers

A special night course on industrial hygiene for welfare and personnel managers, safety engineers, nurses and factory medical aids will be given one night a week during the current year at the Carnegie Institute of Technology. The course, which will begin Friday night, Oct. 30, will be conducted by Harold L. Lang, professor of biology and public health, and will cover the relationship of occupation to the health of the worker, and means for the prevention of occupational diseases; consideration of the spread of infectious diseases; dusty trades; industrial poisonings; industrial accidents; ventilation; lighting and sanitation of factories; and other problems of vocational hygiene.

More Optimism Seen in Europe

England, Germany and Belgium Share in Better Feeling—Strike Continues in Belgium

(By Cablegram)

LONDON, ENGLAND, Oct. 19.

RECENT American purchases of pig iron have caused a better feeling in the Cleveland pig iron market and domestic consumers are displaying more interest. Export sales are hampered by Continental competition. Pease & Partners, Ltd., will restart the Tees Ironworks, after 12 months of idleness [to fill the American order reported last week]. Hematite demand is broadening, with fair sales to domestic and export buyers. Makers are asking higher prices.

Foreign ore is dull. Bilbao Rubio is held nominally at 20s. ($4.84), c.i.f. Tees.

Domestic demand for finished steel is improving on weaker prices, but the export demand is still poor and makers are prepared to grant further concessions.

Sheets and Tin Plate

Tin plate is firm and makers generally are quoting higher, up to 20s. ($4.84) basis, IC, f.o.b., having been paid for first-quarter delivery. Both domestic and export demand are broadening.

Galvanized sheets are strong, on continued sales, and most makers are sold out for this year. Some are quoting for February as the earliest available delivery for thicker gages. Thin specifications have only moderate demand.

There is a steady, small business passing in Japanese thin black sheets and some inquiry from other markets, but sales are few.

On the Continent of Europe

Continental markets are somewhat disorganized by irregular movements of franc exchange and works' quotations vary by several shillings. Business is, consequently, difficult, though domestic users of semi-finished steel are more inclined to cover for forward needs.

Sheet bars are now being sold at £4 12s. 6d. and £4 15s. ($22.39 and $23), both f.o.b., for January and February shipment. Merchant bars have been sold at £5 4s. (1.12c. per lb.), f.o.b., but higher prices are asked now.

Thirty-two Belgian blast furnaces were in blast Oct. 1.

The French Comptoir des Voies Ferrées (Railroad Commission) has ordered 10,000 tons of rails, part from the Société Anonyme des Hauts-Fourneaux de la Chiers, Longwy-Bas, Meurthe-et-Moselle, and the remainder from Hagondange.

Krupp has received a contract from Russia for agricultural machinery totaling several million marks.

BELGIUM IMPROVING

Prices Stiffening and Order Books Well Filled—Strike Goes On

ANTWERP, BELGIUM, Oct. 1.—In every respect our market remains stationary and still the conditions show some improvement. Large orders only enable buyers to obtain price concessions, and in such cases reductions are small. Nominally quotations have not changed. Several makers are well booked ahead and shipment delays are becoming longer. For certain commodities delivery not before two to three months is current.

Of course the strike, which still lasts in the Charleroi district, is partly a cause of this situation. There is no sign of a settlement in the near future. Workpeople refuse categorically to resume work with the

British and Continental European prices per gross ton, except where otherwise stated, f.o.b. makers' works, with American equivalent figured at $4.84 per £, as follows:

Durham coke, del'd..	£0	18s.				$4.36		
Bilbao Rubio ore† ...	1	0½				4.96		
Cleveland No. 1 fdy.	3	9½				16.82		
Cleveland No. 3 fdy.	3	6½				16.09		
Cleveland No. 4 fdy.	3	5½				15.85		
Cleveland No. 4 forge	3	4½				15.61		
Cleveland basic	3	7				16.21		
East Coast mixed....	3	14½				18.03		
East Coast hematite	4	19				23.96		
Ferromanganese	15	10				75.02		
*Ferromanganese ...	15	5				73.81		
Rails, 60 lb. and up..	8	0	to £8	15s.		38.72	to	$42.35
Billets	6	5	to 7	10		30.25	to	36.30
Sheet and tin plate bars, Welsh	6	5				30.25		
Tin plates, base box..	0	19¾	to 1	0		4.78	to	4.84
						C. per Lb.		
Ship plates	7	12½	to 8	2½		1.65	to	1.75
Boiler plates	11	10	to 12	0		2.48	to	2.59
Tees	7	17½	to 8	7½		1.70	to	1.81
Channels	7	2½	to 7	12½		1.54	to	1.65
Beams	6	17½	to 7	7½		1.49	to	1.60
Round bars, ¾ to 3 in.	8	7½	to 8	17½		1.81	to	1.92
Steel hoops	10	15	and 12	10*		2.32	and	2.70*
Black sheets, 24 gage	11	5				2.43		
Black sheets, Japanese specifications	15	5				3.30		
Galv. sheets, 24 gage	16	10, upward				3.57, upward		
Cold rolled steel strip, 20 gage	18	0				3.89		

*Export price.

†Ex-ship, Tees, nominal.

Continental Prices, All F.O.B. Channel Ports

Foundry pig iron: (a)								
Belgium	£3	2s.	to £3	3s.		$15.00	to	$15.24
France	3	2	to 3	3		15.00	to	15.24
Luxemburg	3	2	to 3	3		15.00	to	15.24
Basic pig iron: (a)								
Belgium	3	1	to 3	2		14.76	to	15.00
France	3	1	to 3	2		14.76	to	15.00
Luxemburg	3	1	to 3	2		14.76	to	15.00
Billets:								
Belgium	4	10½	to 4	11		21.90	to	22.03
France	4	10½	to 4	11		21.90	to	22.03
Merchant bars:						C. per Lb.		
Belgium	5	6	to 5	7		1.14	to	1.15
Luxemburg	5	6	to 5	7		1.14	to	1.15
France	5	6	to 5	7		1.14	to	1.15
Joists (beams):								
Belgium	5	2	to 5	3		1.10	to	1.11
Luxemburg	5	2	to 5	3		1.10	to	1.11
France	5	2	to 5	3		1.10	to	1.11
Angles:								
Belgium	5	4				1.12		
⅛-in. plates:								
Belgium	6	0				1.30		
Germany	6	0				1.30		
⅜-in. ship plates:								
Belgium	6	3	to 6	5		1.33	to	1.35
Luxemburg	6	3	to 6	5		1.33	to	1.35
Sheets, heavy:								
Belgium	6	14	to 6	15		1.45	to	1.46
Germany	6	14	to 6	15		1.45	to	1.46

(a) Nominal.

smallest reduction of previous wages, while makers find such a reduction justified. Workpeople of other districts, such as Liége, accepted the cut, notwithstanding their wages were already lower, while for both districts production costs are too high compared with obtainable prices.

Except for a few materials, French prices are not lower than ours. German competition, on the other hand, is much weaker.

Rolled Steel.—Demand is satisfactory and price concessions are now done only in special cases and for large quantities. Prices in general have remained the same but with better tendency. Makers show much resistance and justify their attitude by the fall of exchange. Many works are out of the market for different products, being fully booked until the end of the year. Of course the strike has considerably reduced production, so that in general the other works, too, are well provided with orders.

Belgian makers ask for bars £5 7s. (1.15c. per lb.), f.o.b. Antwerp, but it appears clearly that business is accepted at £5 6s. (1.14c.). Neither Luxemburg nor French makers quote lower. German offers are at the same level but turn out somewhat better as, to obtain orders, the Germans make concessions in extras. Joists are weak as before, and £5 1s. and £5 (1.09c. and 1.08c.) are certainly the highest prices paid. Hoops keep up well, especially as the largest producers are out of the market on account of the strike.

Wire rods are firmer and well asked for. Certain makers quote as high as £5 18s. (1.30c.), against £5 15s. (1.26c.), which was the nominal quotation during the last few weeks.

Nominal prices, f.o.b. Antwerp, with American equivalents, are:

Bars (basis)	£5 6s.	$26.00	1.16c. per lb.
Beams	5 3	25.20	1.13
Angles	5 6	26.00	1.16
Channels	5 3	25.20	1.13
Rods	5 16	28.35	1.27
Corrugated bars	5 18	29.00	1.30
Steel hoops	7 5	35.40	1.58
Cold rolled hoops	11 10	56.00	2.50
Wire rods	5 15	28.10	...

Sheets.—Belgian makers counteract as much as they can the tendency for lower prices. This market shows signs of weakness, especially for thick and medium material. Belgian prices at £6 3s. and £6 13s. (1.33c. and 1.44c. per lb.), for respectively 3/16-in. and ⅛-in. sheets had to be reduced on account of strong French competition. In fact, prices from this side were certainly 1 or 2s. lower. German prices are not dangerous for the moment. Prices may be named as follows:

Thomas steel sheets	¼-in. and more £6 3s.	$30.00	1.34c. per lb.
	3/16-in. and more 6 13	32.75	1.46
	⅛-in. and more 8 5	40.40	1.80
	1/16-in. and more 8 15	42.70	1.91
Checkered plates, base	7 0	34.20	1.53

Blooms, Billets and Slabs.—Prices are undecided, as quotations differ much from maker to maker. A good number of works are out of the market. Nominal prices, which did not develop export business, have not much changed. They may be stated as follows:

Ingots	£3 18s.	$19.00
Blooms	4 8	21.40
Billets	4 12	22.30
Slabs	4 15	23.30

Iron.—The situation remains the same. No export business materializes. Price for No. 3 quality for export is £5 10s. or $27. Domestic demand, if not important, is sufficient for the production.

Pig Iron.—This market continues to remain firm. The higher rates of exchange had caused an increase of prices which, on account of the domestic demand, is maintained without difficulty. Stocks of foundry iron do not exist and Belgian makers are reported to be sold out until the end of the year. Phosphorus foundry pig iron with 2.5 to 3 per cent Si is quoted at 340 to 350 fr., which is approximately $15.80, f.o.b. Antwerp. Low-phosphorus iron, Belgian made, costs 415 to 420 fr., f.o.b. Antwerp, i.e., $19. Therefore the sale of English hematite is nearly impossible.

Coke.—Remains weak. Demand is not large and price concessions may be obtained.

GERMANY DRAGS BOTTOM

Decline Stops and Improvement Impends—Steel Trust Progress—Export Rebates

BERLIN, GERMANY, Oct. 4.—While the depression in iron and steel has made no further progress, and there are even slight signs of improvement, the general position of industry is slowly deteriorating. Most labor union reports show increases in the percentage of unemployed. In August, unemployed in the iron, steel and steel-consuming industries rose from 3.46 to 4.34 per cent, but no further increase seems to have occurred in September. The commercial banks' bimonthly reports for Aug. 31 clearly indicate a slackening in business. The Luther Cabinet attributes the business dullness to excessive prices; but this conflicts with the fact that steel and coal, in which the greatest dullness prevails, are the cheapest of all commodities as compared with their pre-war prices.

The Cabinet is continuing its price-reduction policy. After cheapening credit from public sources, it has reestablished police control of the retail prices of certain necessaries, and is taking measures against cartels, and even threatening to dissolve them under the Marx Cartels Ordinance of 1923. In particular it wages war upon the practice of certain cartels of invoicing in dollars, a practice dating from inflation times, the justification of which has disappeared. The wholesale price level is not rising, but that is largely due to the heavy drop in grain prices and in the prices of certain raw materials. Since January, the official wholesale index (100 in 1913-14) has dropped from 138.2 to 124.9; but the cost-of-living index between February and August rose from 135.6 to 145.

Steel Syndicate Quotas

The decline in volume of home and foreign steel orders ceased in about the third week of September, and at present the industry is in a state of equilibrium. The pig iron market is dull and big stocks of unsold material are on hand. The Raw Steel Syndicate announces the retention throughout October of its 35 per cent reduction of output. Düsseldorf reports that, despite the big drop in pig iron output in the first nine months of the year, only 60 per cent of this output was sold. The delivery terms for bars and bands have shortened, and some works now deliver within a fortnight. The export market has not improved. France and Belgium continue to depress prices. The outlook at the end of September was that there would be no material improvement in either the home or foreign market during the remainder of the fall.

Changes in Export Rebates

For October some of the Steel Syndicate's rebates on the prices of raw material bought from it for conversion into manufactured goods for export have been changed. The rebate on slabs has been changed from 20 to 15 marks per metric ton, and on wire rods from 17½ to 20 marks. Other rates remain unchanged at: ingots, 10 m.; blooms, 15 m.; bars, 20 m.; structural forms, 20 m.; medium sheets (1 to 3 mm.), 10 m.; dynamo and transformer sheets, 40 m.

Swedish trade journals publish sharp attacks upon this system, which materially increases the competitive ability of German finishing manufacturers. The manufacturers, however, demand further concessions. They are displeased that the Steel Syndicate does not make the rebates in cash, but instead issue certificates, which are taken in payment for future orders; and the syndicate is about to make a concession on this point. The manufacturers also complain that they are tied to the Steel Syndicate, because they get no rebate on steel ordered from other quarters. Manufacturers who consume thin sheets (under 1 mm. or No. 26 gage) threaten to sacrifice the rebate rather than help the Steel Syndicate to consolidate its monopoly.

Business Outlook Encouraging for Remainder of the Year

Possible Recession Early Next Year Indicated by Some Factors—September Building Breaks All Previous Records

BY DR. LEWIS H. HANEY.
DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

Favorable Factors

1. *Commodity prices fairly stable; Bradstreet's index up slightly.*
2. *Unfilled orders increase.*
3. *Diminished prospect of tight money markets.*
4. *Retail trade gained in September.*
5. *Business failure trend downward.*
6. *Building activity very great.*
7. *Automobile production well sustained.*

Unfavorable Factors

1. *P-V line down.*
2. *New enterprises decline sharply.*
3. *Stocks of manufactured commodities large for the season.*
4. *Decline in grain prices.*
5. *Extended speculation in real estate and stock markets.*
6. *Money rates at a point near investment yields.*

THE balance of the favorable and unfavorable factors in the business situation continues to lie on the side of the favorable, and a judgment based upon an attempt to appraise the total situation must be that at least moderate improvement in business will continue during the remainder of the year. This means increased production, sustained average prices, and absence of monetary stringency.

It will be noted, however, that two of the most sensitive barometers are now pointing downward. We have sufficient confidence in these barometers to venture the opinion that the present moderate expansion in business will be checked very early next year and that a recession of at least minor proportions will develop. This is on the assumption that inflationary tendencies will not be allowed to make great headway. A growing tendency toward speculative optimism may be noted in certain quarters and it can hardly be denied that further inflationary developments are a *possibility*. If this possibility were to be realized the minor recession here forecast would, of course, be postponed and a more serious one would come later next year.

Freight Movement Heavy

THE most striking point shown in Fig. 1 is the good recovery in railroad tonnage during September. It is apparent from the graph that in September the tons hauled by the railroads nearly reached the peak of the year. We estimate the total tonnage at approximately 1,298,000,000, which compares with 1,278,000,000 in August. Even when full allowance is made for the usual seasonal gain, this represents a considerable increase. This is the more notable in that there were fewer cars loaded with coal in September than in August. The number of less-than-car-load merchandise cars in four weeks of September was considerably greater than in four weeks of August.

Such a development is bound to be reflected in increased railway earnings and ultimately in improved buying of materials by the carriers.

The volume of bank checks drawn (bank debits) decreased in September when adjustment is made for the usual monthly ups and downs. Thus the bank-debits curve resumes the erratic trend which has characterized it this year. The average weekly volume of bank debits in September was $11,370,000,000 against $10,641,000,000 in August, but this increase is considerably less than the usual 5 per cent gain which occurs between the two months. Bank debits in September stood just about where they did in February. The figures show that business is at a very high level, but that as measured by checks does not make much forward progress.

The conclusions from the foregoing are that we are

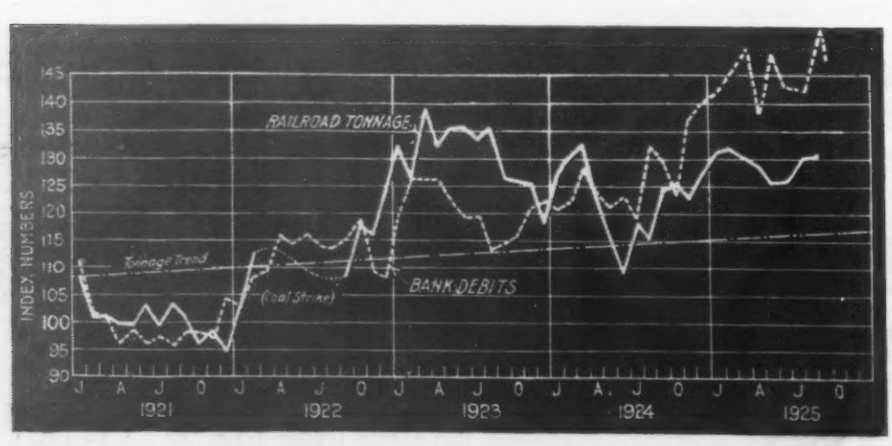


Fig. 1—The High Rate of Tonnage Handled by the Roads Will Eventually Be Reflected in Good Earnings and Increased Purchases

In This Issue

Steel barometers indicate real market improvement ahead.—No large increase in steel production is to be expected in immediate future, however.—Page 1129.

Some indications of business recession early next year.—Excessive real estate and stock speculation, rising money rates, grain price drop, decline in number of new enterprises.—Page 1126.

Save an average of $620 a year by using new invoice forms.—Say 35 firms queried about value of standard invoice forms: Ford purchasing agent suggests new type.—Page 1106.

How much below cost can you afford to take an order and still be better off than if you did not get it?—Method outlines whereby exact point can be determined by any manufacturing organization.—Page 1102.

Bituminous coal for domestic heat costs less than anthracite.—And if senseless deadlock between miners and operators continues, public can easily adopt the cheaper fuel to advantage.—Page 1130.

1925 *may be record year for consumption of reinforcing bars.*—Increased cement consumption indicates larger use of steel for reinforcing.—Page 1097.

Country still full year behind in building requirements. — Says survey of building journals: More than $5,000,000,000 worth of new construction needed to bring building up to date.—Page 1132.

Sales forecast should precede departmental budgeting.—And adequate sales research will lower production costs, smooth out seasonal fluctuations, increase volume of business.—Page 1100.

Brown & Sharpe require fee from apprentice applicants.—And examination is given to eliminate undesirables: 90 now in plant, with waiting list anxious to enter foundry training school.—Page 1104.

Get approval of insurance inspector before repairing welded boiler.—And get him to sign a statement that work has been properly done.—Page 1134.

Would one central convention city with ample auditorium facilities serve associations better than present meeting places?—Method of annual change not wholly satisfactory.—Page 1131.

Sticking of steel cores in aluminum casting may be corrected.—A wash of lime and sodium silicate will prevent this: however, this may mar the finish.—Page 1116.

Six standard aluminum alloys regularly used for aircraft castings.—Summary of composition, properties and uses.—Page 1116.

Chromium base furnace lining best for brass foundry.—Two men working opposite each other in ramming also increase life of furnace.—Page 1115.

Dolmite clinker claimed more economical than raw stone in open hearth practice.—Rapid corrosion of high silica clinker probably due to reduction of iron oxide in clinker.—Page 1114.

Carbon, manganese and silicon content said to have as much influence on teeming steel as temperature.—Questions whether it is necessary to tap at temperature to get skulls.—Page 1112.

Time taken for washing out furnace after heats is well repaid.—One superintendent allows 30 to 60 min. after each heat: furnace should be carefully washed out when bottom is "bad" before rabbling.—Page 1112.

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Two Types of Convention

WHAT the convention reporting service of THE IRON AGE means is illustrated in the accounts in this issue of the meeting in Cleveland of steel makers and the meeting in New York on management.

In the one case there was a steady three-days' flow of facts, figures, experiences and opinions. This called for a full and prompt report for the helpful impulse it should give to the movement toward improving open-hearth steel making operations.

The management conference in the nature of the case was broad in scope, and it remained for THE IRON AGE to sift from the voluminous contributions what was likely to have applications in the iron, steel and metal working fields.

In both cases careful selection of pertinent matter has been the policy guiding the preparation of the text.

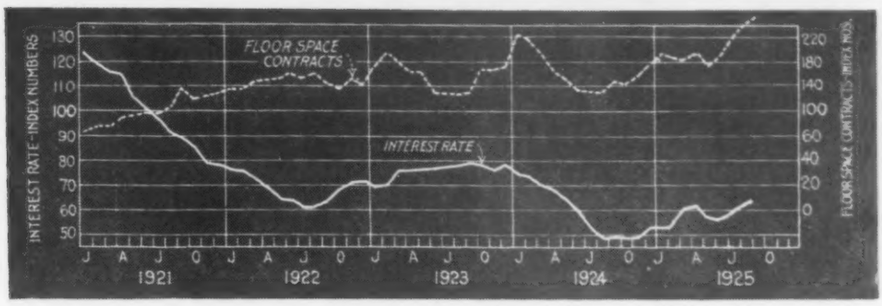


Fig. 4—Building for September Broke All Previous Records and Suggests That a Possible Recession Is Not Far Off

well along the upward movement in a major business cycle which bids fair to establish new high levels for volume of industrial output.

It is perhaps worth noting that in October, 1922, the curve of railroad tonnage rose to a point very near to the bank debits curve and that this relationship preceded the 1923 peak by six or seven months. It meant that production and shipments of commodities were about to exceed a sound relationship with the volume of sales. If the present trend continues, the tonnage curve will again rise above the bank-debit curve; but the present situation does not indicate that this crossing will occur soon, and consequently such a readjustment as was forced in 1923 is not yet to be forecast.

P-V Line Turns Down

THE P-V line (which is the ratio of commodity prices to physical volume of trade) has turned downward slightly. This sensitive barometer of the general business condition, therefore, suggests a less favorable forecast for a period beginning early next year. Its downturn means that in spite of well sustained average commodity prices, the physical volume has gained so much that it is probable that the demand for goods at present prices cannot be long maintained.

It is to be borne in mind that this forecast applies to a time four or five months ahead, and that it may indicate a mere minor recession such as occurred early in 1922. This seems rather probable, since no boom levels are likely to be reached and serious maladjustments in industry and trade are absent. The similarity between the recent trend of the P-V line and its course last year is remarkable.

Usually the P-V line forecasts the trend of ingot production, and September developments proved no exception. (See Fig. 2.) The downturn in our adjusted index of steel ingot output in September was as expected. The continued gradual decline of the P-V line indicates that no large increase in production lies immediately ahead, which is as it should be in the best interests of the iron and steel industry.

Steel Outlook Favorable

THE two barometers of the steel industry shown in Fig. 3 present a favorable aspect. The main barometer, which is the rate of change in the unfilled orders of the United States Steel Corporation—making allowance for seasonal variation — moved upward sharply in September, thus forecasting real improvement in the steel market during the next two or three months. The situation in general resembles that found in August, 1924, at which time it will be remembered the industry began a considerable improvement.

The average of heavy melting steel scrap prices

(*Concluded on page* 1155)

Fig. 2 — The Steel Ingot Trend Closely Follows the P-V Line

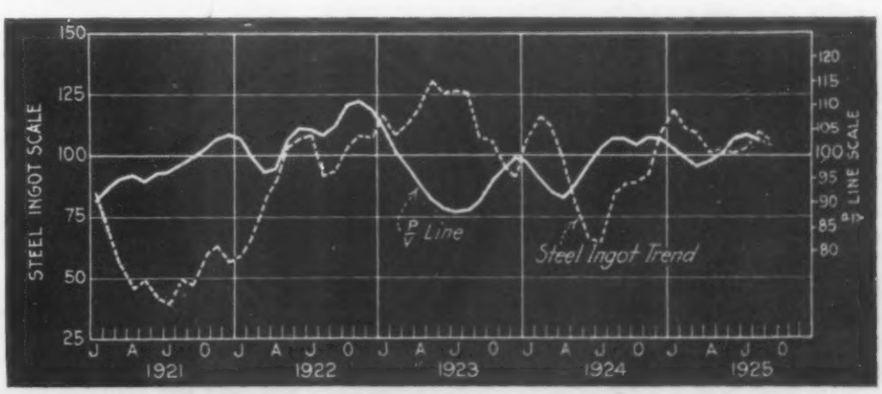
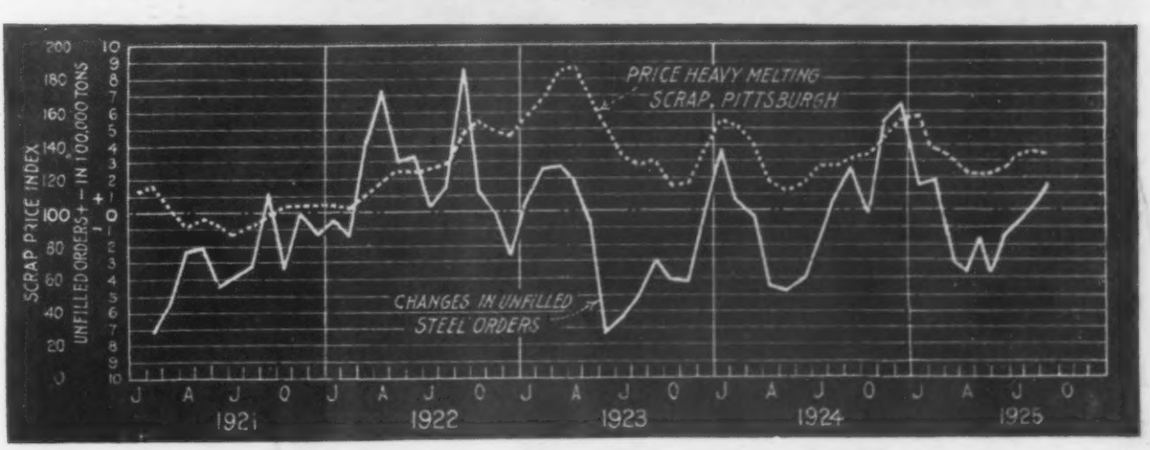


Fig. 3 — The Upward Trend of the Curve Showing Changes in Unfilled Tonnage Is a Distinctly Favorable Factor in the Steel Situation



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An Anthracite Revolution?

JOHN L. LEWIS expressed himself angrily last week. He charged the anthracite operators with skinning the public and butchering the poor coal miners; he was contemptuous of John Hays Hammond as adviser of the public, and finally he warned the public that pretty soon it, collectively and individually, is going to be mighty cold.

S. D. Warriner replied in behalf of the operators with much truth, no doubt, but in the inept and unconvincing way that always marks the statements of the anthracite operators.

John Hays Hammond said nothing.

If the anthracite operators and miners are unable to discern the present temper of the public they are singularly blind. The public is neither worried nor scared. It thinks that anthracite is a clean and convenient fuel, but also a very costly one. Even before the strike the expense for it was burdensome. If now the public is not to be permitted to have it at all, so be it. Heat can be got from bituminous coal and at a much lower cost, New England people are discovering. New York and other places are suspending their anti-smoke ordinances, so that bituminous coal may legally be burned, after having been increasingly tolerated in the gradual turning away from anthracite. The people of Massachusetts are showing a grim determination to emancipate themselves.

The real solution of the anthracite problem is in revolution. Let the operators have their mines and sit on them. Let the anthracite miners have their sole right to work in them and have no work. If the end of unreason be the destruction of capital, let that be set down as one of the fortunes of war and revolution, but with the congratulatory thought that in the American economy this is a relatively trifling affair and not the whole thing as it was in Russia.

THIRTY-NINE million freight cars loaded with freight on the railroads of the United States in the first 40 weeks of 1925 make an impressive picture of the extent of the year's industrial activity. Not only is this the greatest of such movements on record, exceeding the previous "high" of 1923 by 1½ per cent, but the gap is widening. Thus, during the six weeks ended Oct. 3 the figures have been: 1925, 6,534,352 carloads; 1923, 6,320,040 carloads. And the gains, ranging from 23,000 to 46,500 have been consistent for all the six weeks. For the entire year, the 1923 total of 49,814,970 surpassed the previous record (1920) by 4,690,000 carloads. If the present trend is not changed, 1925 should show an excess of 1,000,000 carloads over 1923.

Commodity Price Trends

AMONG economists the prevalent opinion is that commodity prices will trend slowly downward for an indefinite number of years. On the other hand, there has been a slow upward swing for three and a half years past, according to the Bureau of Labor's index number. The principal fluctuation in this scientifically prepared index was that after the liquidation of 1921 the low point of 138 was struck for January, 1922, the number rising to 156 for November and December of that year. For the past three months the number has stood at about 160.

We have had three and one-half years showing a slight rise, and a year and a half that at any rate has brought no decline, for the number was at 159 in both March and April of last year.

If the opinion is correct that there should be a long period of slowly sagging prices, then the present level, with no decline for some time past, in a sense represents an advance. Hence the matter is of particular importance.

For further analysis recourse may be had to the details, for the index number is made up of a great number of prices, and these prices have not been hanging together over a period of years. Using 1913 as base, some commodities persist in staying much above the general average, others much below. This has gone on long enough to indicate that there is something else to be considered. In a general discussion of "Long Range Price Trends" in this department of THE IRON AGE of Sept. 17, referring to the swings of 125 years past, it was pointed out that there are two gen-

eral influences, one being the economies and improvements effected in production and the other the development of scarcity of materials.

The September statement of the Bureau of Labor's index number may be studied from this angle. For all commodities the base is the average of the commodity in 1913. The composite shows for last month 159.7, against 160.4 for the preceding month.

The ranges above and below this general average are marked. When a commodity ranges above 160 it means that it is higher priced relative to all commodities than it was in 1913, and vice versa. That was twelve years ago, and there has been time for improvements on the one hand and for partial depletion of supplies on the other hand to exert quite an influence. Interesting commodities above the general range, with their index numbers, are these:

House furnishings	232.9
Anthracite coal	229.0
Woolen and worsted goods	206.9
Building brick	204.1
Bituminous coal	200.4
Boots and shoes	186.7
Paper and pulp	186.5
Lumber	182.8

Woolen goods, paper and pulp and lumber may be excused, so to speak, on the ground that naturally supplies may have grown scantier. With boots and shoes the question would be whether a reduction in grazing overbalances the improvements that ought to be made in methods of manufacture. With house furnishings, coal and brick, no good excuse presents itself. Methods should be improved so as to make these things relatively cheaper.

Interesting commodities below the general range are the following:

Fertilizing material	108.2
Non-ferrous metals	113.1
Chemicals	128.7
Iron and steel	133.7
Furniture	147.7

These lines reflect the normal trend over all time for commodities to grow cheaper through improvements. Yet iron and steel have been handicapped by ores growing leaner and by fuel growing much more expensive, and furniture by wood being less plentiful. This shows that "it can be done."

THE magnitude of the world's aluminum industry and the importance of the production and consumption of the United States are emphasized by the recent publication of statistics for 1924. According to the *Metallgesellschaft*, the world's production last year was 188,400 metric tons, an increase over 1923 of 21,000 tons, or 12.5 per cent. The American output was about 85,000 tons, or more than 45 per cent of the total. In the same year the American consumption was 103,000 tons, or about 55 per cent of the world total of 187,200 tons. Thus our consumption exceeded our output by about 18,000 tons. Apart from the question that has been raised as to the existence of a monopoly in this country is the fact that our domestic supply does not equal the demand. The expansion of this industry is one of the notable achievements in the metal field in recent years. In 1913 the world output was only 64,800 tons, or about one-third that of last year. Forty years ago, when the industry was in its infancy, the light gray metal was an expensive curiosity. Today it is almost indispensable in the household and forms the basis of the important light alloys which, equal to mild steel in strength, are the vital factors in aviation.

Gaining on Open-Hearth Problems

SEVERAL thoughts are provoked by the conference of open-hearth superintendents last week at Cleveland. The American Institute of Mining and Metallurgical Engineers, under the direction of President Reynders, has made progress in its plan to give a large place to ferrous metallurgy in its varied program. The relatively informal round table at Cleveland was prolific of much practical information, as is usual in groups needing to agree, at least as a starting point, on fundamental facts. Science in steel making is being accepted as an essential help to the art, and the variable human element will be eliminated as fast and as far as may be. The steel maker is finding very exacting customers; and the sheet bar, among other things, is no longer an ordinary product easy to make. Quality has definitely displaced quantity as the problem of the hour in the steel plant, and there is marked success in solving the quality problem. In every detail the Cleveland meeting gave assurance that the industry is directed by capable operating men who give as well as take in the pooling of information for the common good.

A Central Exhibition City?

TWO large technical societies have just held their annual conventions and exhibitions. That of the American Society for Steel Treating was conducted under almost ideal conditions. The American Foundrymen's Association, on the other hand, was handicapped by several unfavorable factors. The steel treaters met in a large and well located city, where substantially adequate space was available for the exhibition and where hotel accommodations were ample. For the foundrymen a relatively small city in New York State was chosen, which fell short on the score of climate as well as accessibility, and where primarily the attendance was cut down because of lack of hotels, with resulting confusion and discomfort. While space for the exhibition was ample, it was demonstrated that fair grounds are not the best place for such gatherings in the fall or spring of the year. Many of those present were reminded of the foundrymen's convention in Columbus in October, 1920, where cold fair ground buildings chilled the enthusiasm as well as the tissues of the visitors.

Should not serious thought be given to centralization and standardization in connection with these annual gatherings? If they are to expand as they have in the last few years—particularly in the exhibition features—some reforms will be necessary. There is growing support for the opinion that a centrally located city with ample auditorium facilities should become the permanent meeting place. The advantage of rotation between

the East and the West would be lost, but this would be offset by many gains. Some such plan must be adopted eventually if the exhibition feature and the financial advantage going with it are the prime considerations.

Building Still Foremost

EVERY year the United States rebuilds Philadelphia. That is one way of visualizing the annual normal building requirements of the country, for every twelve months the normal growth of population and business demands new building approximately equivalent to a city the size of Philadelphia.

When, therefore, the *Building Age and National Builder* reports that a recent survey of the building needs of the country, made in 700 towns and cities, shows more than a year of actual building still required, it is possible to picture what the building situation may mean to the iron and steel industry. More than $5,000,000,000 worth of new buildings, according to this journal, is needed to bring the country to a level with current requirements.

But that does not tell it all. The lumber entering into that $5,000,000,000 worth of buildings will be cut with steel saws and axes; worked with steel tools, and held together by steel spikes and nails. The bricks required will be pressed on iron and steel machines. The cement will be ground in steel mills. The plumbing will require miles of piping and tons of fixtures. The heating plants will consume the output of scores of foundries.

Further along in the chain of sequences is the vast buying power let loose in the expenditure of such a sum of money; the demand for automobiles, furniture—the long list of necessities and luxuries, many of them requiring iron or steel in their construction, and all involving the use of machinery at some point in their production.

It has been estimated that normal growth demands the building of more than 1000 homes every day in the year to keep pace with the population. That would mean that if the shortage shown by the recent survey is made up by the fall of 1926, the coming year's construction must represent the equivalent of 2000 new homes a day.

Admittedly the greatest single factor in our prosperity is the volume of construction. Its continuance on a large scale, in the face of repeated prophecies as well as assertions of its subsidence, is the outstanding feature of the present economic situation. For that reason it will be the more closely watched in the coming months for signs of over-stimulation, especially in view of a speculation in real estate that is almost country-wide.

JAPAN TO BUY PIPE

Gas Company Inquiry—Small Sheet Purchases —American Importers Active

NEW YORK, Oct. 20.—Although trade with China continues quiet, the volume of inquiry from Japan shows a slight increase. South American markets are reported to be maintaining a moderate demand for barbed wire and small lots of other products. Probably the outstanding inquiry from Japan is for about 300,000 ft. of 1-in. gas tubing from the Tokio Gas Co. This company has closed on 400 tons of tank plates for a gas tank, placing the order with Mitsui & Co. for execution by an American mill. The Shibaura Engineering Co. has closed another of its periodical purchases of electrical sheets, placing 350 tons in the United States. The Keh-Hin Electric Railway awarded its 2½ miles of 100-lb. rails to a large Japanese export house, which placed the tonnage with an American mill.

Current inquiries from Japan include, in addition to pipe, small lots of tin plate, one of these totaling close to 10,000 boxes, and some light gage black sheet purchasing. The ability of American sellers to obtain this sheet business is explained by the claim that British makers of the best brands are sold up and unable to give as early delivery as required by the Japanese merchants. An additional factor is the lower American market, which ranges from $83 to $84 per ton, c.i.f. Japan, with as low as $82.50 per ton reported possible from one maker. Tin plate continues fairly firm, ranging from $5.45 to $5.55 per base box, c.i.f. Japan, the higher price of the range more nearly representing the market on anything but a large tonnage.

Imports

American importers are active and are quoting either Belgian or German Siemens-Martin bars at 1.90c. to 1.95c. per lb., c.i.f. Atlantic port, duty paid. Vigorous efforts are being made to secure the tonnage of reinforcing bars, close to 2000 tons, required for sections 3 and 4 of the Brooklyn sewers. The contractor on earlier sections purchased a total of 6500 tons of reinforcing bars, 1000 tons from an American mill and 5500 tons from a Belgian mill, through William H. Muller & Co., 11 Broadway, New York. A few sizable sales of material have been made recently by importers handling either German or Belgian steel. In most cases the material is of open-hearth quality, but occasionally intermediate grade Bessemer is accepted. One importer in New York recently booked an order for 1000 tons of bars from a warehouse in one of the Southern States and another was awarded about 500 tons of 90-lb. rails, which will be delivered to Galveston, Tex. The fact that importers are offering to furnish open-hearth steel at a few cents per 100 lb. under the current American market seems to arouse more interest in the ranks of the consumers.

The recent purchase by an American company of about 36,000 tons of Middlesbrough pig iron in England, originally reported to have been by a consumer, is now understood to have been made by a dealer quite active in the past in the importation of Indian pig iron. In some quarters it is felt that there may be less Indian pig iron brought into the United States in the future, it being pointed out that the Tata works receives no bounty on iron in contrast to its steel bounty and in addition Japanese consumers with Indian contracts have been pressing for deliveries.

The exceedingly heavy demand for coke by American consumers and for sale to domestic users has stirred the import market slightly and some purchasing of British coke is reported to have occurred recently.

Purchasing Agents Look for Higher Pig Iron

The price of pig iron will continue to rise until it reaches a high mark of $25 a ton by July, 1926, according to a report submitted to the Iron and Steel Conference held in Springfield, Ohio, on Oct. 17 in connection with the sixth district conference of the National Association of Purchasing Agents. A permanent district organization was formed at the closing session of the conference and arrangements were made to meet annually in October. This action was taken following an address by R. M. Sedgwick, Toronto, Canada, national president.

ROGERS-BROWN ORE DEAL

Republic, Inland and Hanna Interests to Take Over Susquehanna Property

BUFFALO, Oct. 20.—An agreement to transfer the Susquehanna iron mine, the Rogers-Brown Iron Co.'s Minnesota property, to a syndicate headed by M. A. Hanna Co. of Cleveland, awaits the approval of three-fourths of the holders of general and refunding mortgage bonds of the Rogers-Brown Iron Co. The pending agreement provides also for what amounts to virtual control of the Buffalo company by the Cleveland company in that the Hanna company proposes to become the exclusive selling agent of the Rogers-Brown iron product over a period of five years and to supervise the management of the Iron River, Mich., mines of the Rogers-Brown Iron Co.

The mortgage bondholders have been notified by interested bankers that foreclosure for default of semi-annual interest due Nov. 1 is a possibility with receivership ultimately probable, "unless steps are taken to relieve the company of unduly burdensome demands on its current assets caused by losses resulting from low operation of the Susquehanna mine."

In a circular letter sent to the general and refunding 7 per cent bondholders, the underwriters propose releasing from the lien of the general mortgage, the company's Susquehanna ore reserve at Hibbing, Minn., and its transfer to a new ore corporation to be formed by the Republic Iron & Steel Co., Youngstown, the M. A. Hanna Co. and the Inland Steel Co., Chicago. This Susquehanna Ore Corporation, if assent is given by holders of three-quarters of the general mortgage bonds, will assume all obligations under two underlying mortgages amounting to $4,004,000. This would relieve the Rogers-Brown company of annual charges for interest and sinking fund exceeding $500,000, all of which is now a claim ranking those of the general mortgage bondholders.

Stockholders owning or controlling upward of 80 per cent of common and preferred shares, of whom William A. Rogers, Frank H. Goodyear, John D. Larkin, Charles W. Goodyear, Hugh Kennedy and Seymour Knox are named in the memorandum of agreement, in which others may join, agree to transfer to the Central Securities Co., to be formed, 20,400 shares of preferred stock and 40,000 shares of the common stock of the Rogers-Brown company, approximately four-fifths of both issues. The Hanna company also is to supervise the management of the Iron River, Mich., mines, transport and sell the ore therefrom over a tentative period of five years for a commission of 10 cents per ton and for five years has the right to be exclusive selling agent for the entire pig iron output of the Rogers-Brown company.

Provision of new working capital needed by the local concern is proposed through the acceptance of $1,000,000 in two- to five-year 6 per cent notes, by its bank creditors, as approximately two-thirds payment of current debts and the sale of another $1,000,000 of five-year 6 per cent notes to a syndicate. The banks that are parties to the re-financing plan, and the approximate amounts owing to each are as follows: Marine Trust Co., Buffalo, $400,000; Buffalo Trust Co., $300,000; Liberty Bank, Buffalo, $300,000; Chemical National Bank, New York, $400,000; Chase National Bank, New York, $100,000. In addition to the creditor banks and the Hanna interests, the Central Trust Co. of Illinois is a party to the pending agreement for transfer of control of Rogers-Brown finances to the proposed new Central Securities Co. Deposit of the bonds and assent to the plan may be made at the Buffalo Trust Co., the Chase National Bank, New York, or the Central Trust Co. of Illinois in Chicago.

National Tube Co. Suspends Pipe Making in Wheeling

The Riverside works of the National Tube Co., at Benwood, W. Va., one of the oldest, if not, indeed, the oldest steel pipe plant in the country, has probably made its last pipe. Operation of the pipe furnaces at that plant ceased recently and the company has offered to provide work for all men who would go to Gary, Ind. A number have accepted since there are not enough jobs at nearby independent plants to go around and there is assurance of steady work and free transportation for those willing to go to Gary.

Formal abandonment of the Riverside works is not immediately likely, as the company has two blast furnaces at this plant, one of which recently was completely modernized at considerable expense, while there is a by-product coke plant and skelp can be produced at costs making a favorable comparison with other units of the company. The company will continue the operation of the coke ovens, blast furnaces and skelp mills and will ship the skelp to its Continental works in Pittsburgh and to its Gary works.

Steel Corporation to Add Two More Cargo Boats to Lake Fleet

Two additional boats will be added to the lake transportation facilities of the United States Steel Corporation for carrying steel from its plants at Lake Erie and Michigan ports to Montreal for its Canadian trade. Two lake vessels, "Steelmotor" and "Steelvender," both for this service, have now been in operation on the Great Lakes for over two years and the Steel Corporation has found this method of handling its steel products very satisfactory.

The boats are operated by the United States Steel Products Co., a Steel Corporation subsidiary, which is having the additional boats built by another subsidiary, the Federal Shipbuilding Co., Kearny, N. J. The new boats will be of Welland canal size, about 255 ft. long, and practically duplicates of the two boats that are now being operated. The two new boats probably will be placed in commission next spring.

Commission Invites Further Expressions in Southern Class Rate Case

WASHINGTON, Oct. 20.—Further expressions from interested railroad and shippers in connection with the Southern class rate case have been invited in a statement issued by Commissioner Joseph B. Eastman, who announced that these opinions may be filed on or before Nov. 7. These additional statements will be studied before the Interstate Commerce Commission reaches any conclusions with respect to various statements by carriers and shippers. Carriers in the South as well as in the North have emphatically protested against the findings in the case and have asked that they be reconsidered and modified in many important respects.

Large Pig Iron and Steel Output of Wickwire Furnaces

The Y furnace of the Wickwire Spencer Steel Corporation, at its Buffalo plant, made in September 17,721 tons of basic iron having an average silicon content of 1.05 per cent and an average sulphur content of 0.034 per cent, the coke consumption being 1847 lb. per ton of iron. The furnace is 18 by 21 ft. with a 17 ft. 6 in. hearth. It was operating with an 81 per cent Mesaba mixture. At the same plant two 60-ton open-hearth furnaces, using this pig iron, produced 9400 tons of ingots in September.

Walter C. Douglas, Jr., has been appointed receiver in equity for the Hoopes & Townsend Steel Corporation, Philadelphia, which owns several bolt and nut manufacturing plants.

WELDING ON BOILERS

Repair Work Should Be Undertaken Only in Cooperation with Insurance or Other Inspectors

BY S. W. MILLER*

IN view of the widening application of fusion welding throughout industry and the probability that repairs to boilers made by this process will be proposed from time to time, it is well that those responsible for the results should bear several points in mind. These, listed briefly, are:

1. Most boilers are insured.
2. Many boiler insurance policies are worded so that if repairs are made without the authority of the company carrying the insurance, the policy becomes void.
3. There are federal, state and municipal regulations governing this work, as well as those issued by the insurance companies.
4. Only competent welders, familiar with boiler work, should be permitted to do the welding.

Therefore, the following precautions should be observed by the owner or his representative:

1. Examine the part of the boiler to be welded, in company with the insurance inspector, and get his approval before doing any welding.
2. Be present with the inspector at the test after welding.
3. If possible, get the inspector to sign a statement that the work has been properly done and that it has passed the test successfully.
4. If the boiler is not insured, and comes under federal, state or municipal supervision, carry out the above program in company with the proper authority.

If the boiler is neither insured nor under supervision of some constituted authority, ample precautions should be taken by the welder and the owner to protect themselves against possible future trouble. They should make a sketch of the location and size of the repair, with a clear statement of what was found wrong and how the repair was made. They should always make a hydrostatic hammer test of the finished job, using a pressure of 1½ times the working boiler pressure, in the presence of witnesses, and get their signature to a statement of the facts. These papers should be carefully filed away. In such a case, no welding should be done which is not permitted by law or by good practice.

In case of marine work, the welder should pass the regular examination of the Federal Steamboat Inspection Service.

In all cases, the welder should make friends of the insurance and other inspectors by refusing to do work unless authorized by them, by being conservative in what work he recommends, and by doing nothing except a first-class job.

*Consulting engineer, Union Carbide & Carbon Laboratories, Long Island City, N. Y., and past president of the American Welding Society.

Shovel Simplification Takes Form

ATLANTIC CITY, Oct. 20.—Effective May 1, 1926, elimination of more than 4000 sizes, finishes and varieties of shovels was adopted yesterday afternoon at a meeting in this city of manufacturers, wholesalers, retailers and users of shovels. The conference was under the auspices of the Division of Simplified Practice, Department of Commerce, and was held in connection with a joint meeting of the American Hardware Manufacturers' Association and the National Hardware Association of the United States.

The Shovel Institute presented a program calling for a reduction from 223 to 127 sizes. The conference voted to eliminate one grade and all but one finish. The only exception to the reduction of finishes was on behalf of the iron molding industry, it being pointed out that a polished shovel was a factor in saving the time of workmen in foundries. The Division of Simplified Practice is authority for the statement that the shovel business of the country amounts to about $10,000,000 a year and that more than 95 per cent of the manufacturers had a part in the development of the simplification program.

Weirton Construction Program Well Mapped Out

Plans for the new construction work at the Weirton Steel Co., Weirton, W. Va., are nearly complete, and a start on the work is not far off. The first part of the program, which will probably cover two or three years for its completion, will be the building of docks and other facilities for the handling of both raw and finished materials by river. The program also embraces the enlargement of the by-product coke plant to provide the fuel requirements of a new 800-ton blast furnace, and three 100-ton open hearth furnaces, the doubling of its present sheet mill and the building of a pipe mill.

No decision yet has been reached by officials of the company as to the type of pipe plant to be built. The present plant was so laid out that the several proposed additions will be made without interruption to operations. The new sheet mill units will be added at both ends of the present mill building, which houses nine hot and four cold mills. The extension of the open-hearth department means merely the building on to the present department, and there is ample space adjoining the present blast furnace and coke plant sites for the new units.

The Steel Plant for Kansas City

The Kansas City Steel Corporation, which will equip a plant in Kansas City, Mo., was influenced in the selection of that city as a site for a steel plant by the large amount of scrap produced in that district that now goes to other consuming centers at low prices and to the freight advantage that the mill will have in the Kansas City territory over the Chicago district mills. Among those interested in the new company is L. W. Conroy, who has been associated with other steel companies and who will have charge of operations. Mr. Conroy is now in Cleveland supervising the removal of the equipment of the Cromwell Steel Co., Lorain, Ohio, which the Kansas City company recently purchased.

Financing Plan for Trumbull Steel Co.

YOUNGSTOWN, Oct. 20.—A special meeting of stockholders of the Trumbull Steel Co., Warren, has been called for Nov. 10 to approve a financing program recommended by directors. The board recommends a $13,000,000 closed first mortgage, 6 per cent, 15-year bond issue and the issuance of $5,000,000 of 7 per cent 10-year debenture notes, convertible into common stock. Arrangements have virtually been completed for sale of the securities.

As of Sept. 28, the Trumbull company's obligations consisted of $16,560,000 notes with the banks and $2,000,000 of acceptances held by merchandise creditors. The financing program indicates that Trumbull will continue as an independent and will not become involved in a merger at this time.

Otis & Co., Cleveland, investment bankers, are negotiating the plans. Cyrus Eaton of that firm will become chairman of the board of directors and another Cleveland banker will be on the Trumbull board according to present plans.

Liquidation of the assets of Jonathan Warner, former president, which were turned over to the company several months ago following disclosure of its financial difficulties, is under way. Mr. Warner's town home, located on Wick avenue in Youngstown, has been acquired by Joseph G. Butler, Jr., presumably acting for trustees of the Butler Art Gallery. The Warner property adjoins the art museum and was acquired to prevent its falling into commercial uses.

FABRICATED STEEL

September Bookings Slightly Better Than in August

WASHINGTON, Oct. 20.—Sales of fabricated structural steel in September, reported to the Bureau of Census by 173 firms, totaled 192,269 tons, representing 80 per cent of their capacity of 240,975 tons. Computed tonnage booked was 232,000 tons, while shipments were 82 per cent of capacity, computed shipments being 237,800 tons. Bookings in August were 198,706 tons, or 79 per cent of the same capacity as that represented in the September reports. Computed bookings in August totaled 229,100 tons while computed shipments that month were 237,800 tons or 82 per cent of capacity, the same as in September.

Computed tonnage booked for the nine months ended with September of the present year amounted to 1,943,000 tons as against 1,705,200 tons for the corresponding period of 1924.

Awards Are Light, but New Projects Up for Bids Total Nearly 50,000 Tons

While structural steel awards of the week were much below the record of recent weeks, being less than 17,000 tons, new projects up for bids are close to 48,000 tons. Two bridges, one at Pittsburgh and the other over the Niagara River, account for 19,000 tons of this total, while eight apartment buildings in New York, requiring about 8000 tons, a New York office building which will take 5500 tons and an Elks' Club in Brooklyn of 3000 tons make up a large part of the remaining tonnage inquired for. The awards follow:

Apartment building, Fifty-fourth Street and Sixth Avenue, New York, 2700 tons, to Paterson Bridge Co.

Apartment building, West End Avenue and 100th Street, New York, 1000 tons, to Paterson Bridge Co.

Apartment building, Fifth Avenue and Fifteenth Street, New York, 600 tons, to Paterson Bridge Co.

Apartment building, Fifth Avenue and Eighty-first Street, New York, 800 tons, to Easton Structural Steel Co.

Brooklyn Edison Co., turbine foundations for power plant in Brooklyn, 300 tons, to Levering & Garrigues Co.

Central Railroad of New Jersey, bridge, 125 tons, to Calumet Iron Works.

Southern Railway, bridges, 750 tons, to Virginia Bridge & Iron Co.

Wesleyan University, Middletown, Conn., chemical building, 175 tons, to National Bridge Works.

State trade school at Bridgeport, Conn., 325 tons, to an unnamed fabricator.

American Bemberg Co., plant at Johnson City, Tenn., 1100 tons, to Virginia Bridge & Iron Co.

New York Telephone Co., exchange building at Sherman Avenue and Thayer Street, New York, 1000 tons, to Hedden Iron Construction Co.

Milk station, Bronx Boulevard and 242nd Street, New York, 400 tons, to George A. Just Co.

Louisville & Nashville Railroad, turntable, 100 tons, to American Bridge Co.

Allegheny River Sand Co., six steel barges, 600 tons, to Midland Barge Co.

Pittsburgh Steel Co., open-hearth building extension, 350 tons, to Bollinger-Andrews Construction Co.

Anaconda Copper Mining Co., Butte, Mont., addition, 350 tons, to Worden-Allen Co.

Milwaukee Eagles' Club House, 150 tons, to Milwaukee Structural Steel Co.

Union Pacific viaduct, Omaha, Neb., 500 tons, to McClintic-Marshall Co.

Studebaker Corporation, South Bend, Ind., spring plant, 1000 tons, to Indiana Bridge Co.

Macmillan Stone Co., New Bedford, Ind., 400 tons, to Indiana Bridge Co.

Utilities Light & Power Co., Dubuque, Iowa, 190 tons, to Dubuque Bolt & Boiler Co.

American Steel & Wire Co., Cleveland, mill building, 1400 tons, to American Bridge Co.

Michigan Central Bridge at Detroit, 680 tons, to American Bridge Co.

Montreal Mining Co., Hurley, Wis., shaft sets for No. 4 shaft, 160 tons, to Worden-Allen Co.

Missouri-Kansas-Texas, car shops at Denison, Tex., 260 tons, to Stupp Brothers Bridge & Iron Co.

State exposition building, Reno, Nev., 300 tons, to McClintic-Marshall Co.

Alhambra Theater, Telegraph Avenue, Oakland, Cal., 250 tons, to Herrick Iron Works.

Masonic Temple, Portland, Ore., 500 tons, to Wallace Equipment Co.

Apartment building, Greenwich and Larkin Streets, San Francisco, 125 tons, to Herrick Iron Works.

Portland, Ore., pipe line, 100 tons, to Steel Tank & Pipe Co.

Atlantic, Gulf & Pacific Co. of Manila, Call Building, San Francisco, 100 tons, to an unnamed fabricator.

Office building, Broad and Cooper Streets, Camden, N. J., 750 tons.

Structural Projects Pending

Inquiries for fabricated steel work include the following:

Royal Indemnity Insurance Co., office building at 150 William Street, New York, 5500 tons.

Elks' Club, Brooklyn, 3000 tons.

Eight apartment buildings in New York totaling about 8000 tons.

Office building, 13-19 West Forty-seventh Street, New York, 1500 tons.

Ziegfeld Theater, Fifty-fourth Street and Sixth Avenue, New York, 500 tons.

Standard Oil Co. of New Jersey, tanks, 100 tons.

St. Francis College, Brooklyn, 300 tons.

Pennsylvania Railroad, bridges, 250 tons.

Hotel, Hendersonville, N. C., 1000 tons.

Mutual Life Insurance Co., office building in Baltimore, 300 tons.

Chesapeake & Ohio Railroad, bridges, 150 tons.

Liberty Bridge, Pittsburgh, 10,000 tons; bids to be opened Nov. 4.

Buffalo & Fort Erie Bridge Co., bridge over Niagara River, 9000 tons; bids to be opened Nov. 5.

Big Four Railroad, turntable, 100 tons, Bethlehem Steel Co., low bidder.

San Francisco Opera House, San Francisco, 2200 tons; bids in about two months.

War Memorial Museum, San Francisco, 2200 tons; first bids in about two months to call for 700 tons only.

Medford, Ore., pipe line from Big Butte Springs to Medford, about 38 miles, 3500 to 4000 tons; no date yet set for bids.

Willys-Overland Co., Toledo, factory building, 100 tons.

Pharis Rubber Co., Newark, Ohio, factory, 150 tons.

Fabricated Steel Plate Bookings in September

WASHINGTON, Oct. 20.—Based on reports received from 35 firms, with data for two concerns estimated, bookings of fabricated steel plate in September totaled 23,895 tons, or 35 per cent of capacity, according to the Bureau of the Census. This compares with bookings of 26,210 tons or 39 per cent of capacity in August. Of the September bookings, 8458 tons were for oil storage tanks, 1505 tons for refinery materials and equipment, 5850 tons for tank cars, 1510 tons for gas holders, 427 tons for blast furnaces and 11,410 tons for stacks and miscellaneous uses.

For the nine months ended with September of the current year, bookings of fabricated steel plate totaled 234,840 tons as against 205,215 tons for the corresponding period of last year.

Mills Attack Rates Between Youngstown and Points East

At a hearing conducted last week in Youngstown, Ohio, before Examiner Kettler, of the Interstate Commerce Commission, complaints of six steel companies in the Youngstown district against alleged prejudicial rates were presented under the direction of H. D. Rhodehouse, traffic manager, Youngstown Chamber of Commerce. The hearing was on a complaint filed by the Truscon Steel Co., the Newton Steel Co., the Fitzsimmons Co., the Concrete Steel Co., the Falcon Steel Co., and the Thomas Sheet Steel Co. on rates between Youngstown and points in western New York and Pennsylvania east of Erie and Corry, Pa., and north of Butler, Pa., and Oil City, Pa., as far as Buffalo.

In addition to asking for a readjustment of the rates, the companies also requested a refund for 1921 to 1923 when combination rates to the points in question were lower than class rates, which the complainants were obliged to pay.

Iron and Steel Markets

SUSTAINED ACTIVITY

Pig Iron Advances Follow a Flurry in Coke

Railroad Buying Keeps Up—A Pennsylvania Contract, But Not for Rails

Buying of rolled steel products is still well up to the rate of the first half of October, which with the leading companies represented some gain over the September average. The demand is most noticeable in automobile, railroad and building steel, and points to sustained activity in those lines in the winter months.

Drawing more attention than its influence on iron and steel markets warrants the excited demand for coke for domestic use has continued. As high as $8 a ton at ovens has been paid for 48-hour coke for shipment to the East as a substitute for anthracite, and prompt blast furnace coke went to $7.50 as against $5 one week ago.

With the uncertainty as to coke cost after Jan. 1 thus accented, some producers of pig iron have advanced their prices 50c. to $1 a ton in the past two days, while others have declined to sell at present for first quarter delivery. Previous to the advances, however, there were considerable sales for the first quarter, notably to radiator and sanitary equipment foundries. The Standard Sanitary Mfg. Co. placed 47,000 tons, and the American Radiator Co. brought its October buying up to fully 50,000 tons. Cleveland and Cincinnati pig iron offices had a notably active week. On the Atlantic seaboard sellers of foreign pig iron have taken a good many orders for the fourth and first quarters at about $21, duty paid.

There is evidence that pig iron producers are chary of tying up their prices too closely with the fuel situation, in view of the possible effect of a sudden anthracite strike settlement in undermining the present coke market.

Another factor is the effect of an advancing coke market on wages at independent Connellsville mines and ovens. Some merchant blast furnace companies, facing high priced coke after Jan. 1, might choose to shut down.

The rate of steel production has not changed and the continuance of an operation around 80 per cent is indicated for some weeks to come.

New rail contracts are not large this week, but there are more details of recent buying. The Union Pacific took 40,000 tons, the Northern Pacific 41,000 tons and the St. Paul 50,000 tons. The Santa Fe inquiry is likely to be for 75,000 tons. The B. & O. is in the market for 75,000 tons of 100 and 130-lb. rails. The Pennsylvania, contrary to report, has issued no inquiry for 200,000 tons.

The Pennsylvania Railroad has bought 30,000 tons or more of plates, shapes and bars for car builders who will repair 6000 cars for that road. Most of this order goes to Pittsburgh.

The New York Central's purchase of 125 locomotives, 100 from one company and 25 from another, was the leading railroad equipment order of the week. The Atlantic Coast Line bought 750 steel gondolas and the Montour Railroad 500 steel hoppers. Total cars purchased were 1787, while locomotives totaled 153.

New structural steel projects total close to 48,000 tons, including a 10,000-ton bridge at Pittsburgh, one of 9000 tons over the Niagara River, 8000 tons for apartment buildings and 5500 tons for an office building in New York, and 3000 tons for a club building in Brooklyn. Awards were less than 17,000 tons, considerably below the average tonnage of recent weeks.

September bookings of structural steel, amounting to 80 per cent of capacity, were slightly over those of August, which covered 79 per cent. Sales for the nine months this year were 1,943,000 tons, or 14 per cent more than for the same period of 1924. Fabricated steel plate business represented 35 per cent of capacity in September, against 39 per cent for August. The nine months' total was 235,000 tons, or 14½ per cent more than in the same period last year.

In line with the effort of sheet mills to establish black sheets on a 3.15c. basis is the announcement this week by leading makers that they have advanced automobile body sheets $3 a ton, or from 4.25c. to 4.40c. per lb. Consumers are generally covered, however, for this year.

The advance in zinc points to a stronger market for galvanized sheets. At 8.30c., St. Louis, zinc today is 2c. higher than a year ago.

Further sales of sheet bars are reported at $33.50, Pittsburgh, though $35 was the basis of third quarter contracts and of considerable fourth quarter tonnage.

THE IRON AGE composite price for pig iron has advanced to $19.88 from $19.71 last week and the week before. The total advance from the low point at mid year is now 92c., or a little less than 5 per cent.

Finished steel remains at 2.403c. per lb., as for the three previous weeks. It is thus but a fraction of 1 per cent above the lowest figure of the past three years.

Pittsburgh

Active Steel Buying, Pig Iron Strong and Coke Soaring

PITTSBURGH, Oct. 20.—There is still an active market in steel, particularly in those products finding large use by the automobile industry, and with railroad buying at last beginning to assume respectable proportions, the mills are beginning to make good the tonnage lost through a slackening demand for tin plate and pipe. Order books of good size exist in sheets, steel bars for cold finishing and in strip steel, while the position of makers of plates is showing improvement so far as advance orders are concerned. The month to date has produced enough business to indicate that October will stand out as one of the big months of the year. The need of higher prices for profitable operation is being stressed so strongly that it is believed a good many buyers are becoming fearful of higher prices, especially as the evidence increases of growing mill order books. They are disposed to order a little further ahead than has been their practice recently.

Advances recently announced in the ordinary finishes of sheets have been supplemented since a week

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics
At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Oct. 20, 1925	Oct. 13, 1925	Sept. 22, 1925	Oct. 21, 1924
No. 2X, Philadelphia‡	**$22.76**	$22.26	$22.26	$21.76
No. 2, Valley furnace†	19.00	19.00	19.00	19.50
No. 2, Southern, Cin'ti†	**23.55**	23.05	23.05	21.55
No. 2, Birmingham, Ala.†	**19.50**	19.00	18.50	17.50
No. 2 foundry, Ch'go furn.*	21.50	21.50	21.50	20.50
Basic, del'd, eastern Pa.	21.00	21.00	21.00	20.00
Basic, Valley furnace	18.50	18.50	18.50	19.00
Valley Bessemer del'd P'gh	21.26	21.26	21.26	21.76
Malleable, Chicago furn.*	21.50	21.50	21.50	20.50
Malleable, Valley	19.00	19.00	19.00	19.50
Gray forge, Pittsburgh	20.26	20.26	20.26	20.76
L. S. charcoal, Chicago	29.04	29.04	29.04	29.04
Ferromanganese, furnace	115.00	115.00	115.00	95.00
Rails, Billets, etc., Per Gross Ton:				
O.-h. rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Bess. billets, Pittsburgh	*33.50*	35.00	35.00	35.50
O.-h. billets, Pittsburgh	*33.50*	35.00	35.00	35.50
O.-h. sheet bars, P'gh	*33.50*	35.00	35.00	37.00
Forging billets, base, P'gh	40.00	40.00	40.00	40.50
O.-h. billets, Phila	39.30	39.30	40.30	41.17
Wire rods, Pittsburgh	45.00	45.00	45.00	45.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.90	1.90	1.90	1.90
Light rails at mill	1.65	1.65	1.65	1.85
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.12	2.12	2.12	2.32
Iron bars, Chicago	1.90	1.90	1.90	2.10
Steel bars, Pittsburgh	2.00	2.00	1.90	2.00
Steel bars, Chicago	2.10	2.10	2.10	2.00
Steel bars, New York	2.34	2.34	2.24	2.34
Tank plates, Pittsburgh	1.80	1.80	1.80	1.80
Tank plates, Chicago	2.10	2.10	2.10	2.00
Tank plates, New York	*1.94*	2.04	2.09	1.94
Beams, Pittsburgh	1.90	1.90	1.90	1.90
Beams, Chicago	2.10	2.10	2.10	2.00
Beams, New York	2.24	2.24	2.24	2.14
Steel hoops, Pittsburgh	2.40	2.40	2.40	2.50

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Oct. 20, 1925	Oct. 13, 1925	Sept. 22, 1925	Oct. 21, 1924
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh	3.10	3.10	3.15	3.50
Sheets, black, No. 28, Chicago dist. mill	*3.25*	3.30	3.30	3.60
Sheets, galv., No. 28, P'gh	4.20	4.20	4.20	4.60
Sheets, galv., No. 28, Chicago dist. mill	4.35	4.35	4.35	4.70
Sheets, blue, 9 & 10, P'gh	2.25	2.25	2.25	2.70
Sheets, blue, 9 & 10, Chicago dist. mill	2.40	2.40	2.40	2.80
Wire nails, Pittsburgh	**2.65**	2.60	2.65	2.75
Wire nails, Chicago dist. mill	2.70	2.70	2.70	2.85
Plain wire, Pittsburgh	2.50	2.50	2.50	2.50
Plain wire, Chicago dist. mill	2.55	2.55	2.55	2.60
Barbed wire, galv., P'gh	3.35	3.35	3.35	3.45
Barbed wire, galv., Chicago dist. mill	3.40	3.40	3.40	3.55
Tin plate, 100 lb. box, P'gh	$5.50	$5.50	$5.50	$5.50
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$17.50**	$17.00	$17.50	$17.50
Carwheels, Philadelphia	18.50	18.50	18.50	17.50
Heavy steel scrap, P'gh	18.50	18.50	18.50	18.50
Heavy steel scrap, Phila.	**17.00**	16.50	17.00	16.50
Heavy steel scrap, Ch'go	16.00	16.00	16.00	16.00
No. 1 cast, Pittsburgh	**17.50**	17.00	17.50	18.00
No. 1 cast, Philadelphia	18.00	18.00	18.00	17.50
No. 1 cast, Ch'go (net ton)	**17.75**	17.50	17.75	17.50
No. 1 RR. wrot, Phila.	18.00	18.00	18.00	17.50
No. 1 RR. wrot, Ch'go (net)	**14.50**	14.00	14.75	14.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$7.50**	$5.00	$3.75	$3.00
Foundry coke, prompt	**7.50**	5.00	4.25	4.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	14.62½	14.62½	14.87½	13.25
Electrolytic copper, refinery	14.37½	14.37½	14.50	13.00
Zinc, St. Louis	**8.30**	8.20	7.85	6.40
Zinc, New York	**8.65**	8.55	8.20	6.75
Lead, St. Louis	9.25	9.25	9.25	8.15
Lead, New York	9.60	9.60	9.55	8.25
Tin (Straits), New York	**62.50**	62.12½	58.50	51.00
Antimony (Asiatic), N. Y.	**18.00**	17.00	17.00	11.75

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

THE IRON AGE Composite Prices

Oct. 20, 1925, Finished Steel, 2.403c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets. These products constitute 88 per cent of the United States output of finished steel.

One week ago,	2.403c.
One month ago,	2.396c.
One year ago,	2.460c.
10-year pre-war average,	1.689c.

Oct. 20, 1925, Pig Iron, $19.88 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham.

One week ago,	$19.71
One month ago,	19.54
One year ago,	19.46
10-year pre-war average,	15.72

	High				Low		
	1923	1924	1925		1925	1924	1923
Finished Steel	2.824c., April 24	2.789c., Jan. 15	2.560c., Jan. 6	Finished Steel	2.396c., Aug. 18	2.460c., Oct. 14	2.446c., Jan. 2
Pig Iron	$30.86, March 20	$22.88, Feb. 26	$22.50, Jan. 13	Pig Iron	$18.96, July 7	$19.21, Nov. 3	$20.77, Nov. 20

ago by increases in the prices of automobile body sheets and long ternes, but it is not yet possible to quote the market squarely at the advanced levels because a few mills still are accepting business at former prices. There is also the obstacle created by the fact that all makers took good-sized orders prior to the advance. The same situation exists in hot rolled flats. Makers of cold finished steel bars also seem to have given their customers enough protection at present levels to make it difficult for them immediately to stiffen the market to a profitable basis.

Coke prices continue to soar under the influence of an excited demand to substitute it for hard coal. In the past few days as much as $8 per net ton at ovens has been obtained for run of oven 48-hr. coke for shipment to the East and $7.50 is as low as any lately has been available. This situation is having some effect upon the pig iron market, but in view of the fact that no actual advance has occurred in prices for delivery over the remainder of the year and that one large purchase for first quarter shipment was made at unchanged prices, it is evident that producers are not disposed to tie pig iron prices up too strongly with the fuel situation, since a sudden settlement of the anthracite strike would not only pull down coke but pig iron as well.

The Standard Sanitary & Mfg. Co. in the past week has closed for 47,000 tons of foundry iron for its four plants, all but 6000 tons of which is for shipment over the first quarter of 1926. There is a feeling that present coke prices cannot go up much further without checking the demand because at present levels coke is probably costing the ultimate consumer more than hard coal and it seems more than likely that there will be a turn to soft coal as a substitute for hard coal. Pig iron producers have indicated considerable opposition to paying anywhere near present prices for their first quarter requirements of coke, and there is a possibility that some of the furnaces now active will be banked Jan. 1 unless there is an advance in pig iron sufficient to cover the higher fuel charges. This would mean that iron would have to sell around $22 at furnace and there are none so optimistic as to believe that such prices are likely.

Recent purchases served to sustain the market on the steel works grades of scrap and foundry grades have actually advanced because of the better demand for railroad castings.

The past week has brought no very marked change in the rate of ingot production in this and nearby districts. The Carnegie Steel Co. last week produced at 73 per cent and this week is scheduled for 75 per cent. Independent operations are somewhat higher and the general average of the territory is about 80 per cent. The Shenango Furnace Co. lighted its No. 1 furnace at Sharpsville, Pa., yesterday, and there are now 81 out of 133 furnaces in production. The Carnegie Steel Co. is said to be figuring on lighting one or two additional Pittsburgh furnaces.

Pig Iron.—Because of the danger of high coke costs, a number of merchant producers of pig iron are now asking an advance of 50c. a ton over recent prices for delivery over the remainder of the year, and for first quarter tonnages some have quotations of $1 a ton higher than they have recently been quoting. While some foundry iron has been sold at $19.50, Valley furnace for No. 2, for delivery this year, a great deal more has been moved at $19. The Standard Sanitary Mfg. Co. has closed within the week for 47,000 tons of iron for its four plants. Of this total 6000 tons will be shipped this year. The company bought 25,000 tons for its local plant, approximately 15,000 tons for Louisville and the remainder for Baltimore. For the latter plant imported high silicon iron was purchased at $21, delivered, or more than $1 a ton below the furnace base of any domestic producer. For its local plants the iron carried a price of $19, Valley furnace, for No. 2 grade, while the company paid $19, Birmingham, for Southern iron and $19.50, furnace, for southern Ohio iron. Some other large consumers are reported to be inquiring for round tonnages, but as a general proposition the effect of the high coke prices is to stimulate shipping instructions on iron already purchased. We note one sale of 1000 tons of Bessemer iron at $19.50, Valley furnace, for shipment over the remainder of this year but there are no sales of basic iron worthy of note.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.76 per gross ton:

Basic	$18.50 to $19.00
Bessemer	19.50 to 20.00
Gray forge	18.50 to 19.00
No. 2 foundry	19.00 to 19.50
No. 3 foundry	18.50 to 19.00
Malleable	19.00 to 19.50
Low phosphorus, copper free	27.50 to 28.00

Ferroalloys.—A fair number of small orders for ferromanganese has been placed for early delivery, but interest is low in supplies beyond the end of the year. There is no change in prices. Spiegeleisen and ferrosilicon are moving steadily on contracts, but not much new business is reported. Prices are given on page 1153.

Semi-Finished Steel.—The recent decline in the fourth quarter price of sheet bars at Youngstown to $33.50 appears to have made it necessary for Pittsburgh district mills to make the same price, f.o.b. Pittsburgh, to their contract customers, and as there is little movement of this form of semi-finished steel, except on contracts, that figure, rather than $35, which is still a quotation, is the real market price. Slabs also have been sold at $33.50 for fourth quarter shipment. Some makers still insist that the billet market is $35, but business at that figure usually is with strip makers, whose specifications are beyond the range of ordinary steel. With extra expense for chipping and cropping there is reason for a "long" price. It would be somewhat unusual for billets to command a higher price than slabs and sheet bars. At $33.50, Pittsburgh or Youngstown, for sheet bars, there has been a decline of $4 a ton as compared with the price at this time last year; a similar comparison of sheet prices discloses a decline in black sheets of about $8 per net ton, and a like drop in galvanized sheets. Most of the blue annealed sheet business now on makers' books was taken at 2.20c. to 2.25c., base, as against 2.70c. at this time last year. There is not much activity in rods and secondary manufacturers are not crowded with business; rivet makers are notably light buyers at present. Open market activity in skelp is light. Prices are given on page 1153.

Wire Products.—Local makers now are finding no difficulty in making sales of nails at $2.65, base, per keg, Pittsburgh, in those districts where recently $2.60 was the ruling figure. Locally, there has been practically no deviation from the higher figure. The market continues to show marked firmness in plain wire, demand for which has been stronger than that in other lines. Barbed wire and fence have not moved so well in fall sales as was expected during the late summer, but manufacturers look forward with confidence to the spring, and there is some building up of stock against a large demand that is looked for during the winter. Mill operations are averaging about 65 per cent of capacity. Prices are given on page 1152.

Rails and Track Supplies.—The local rail-making unit of the Steel Corporation will furnish half of the 85,000 tons of rails placed since a week ago by the Baltimore & Ohio. A considerable part of the New York Central requirements for 1926, amounting to 200,000 tons, also will come to the local maker. Expansion in rail business has not been accompanied by a like gain in the demand for the accessories, which are moving rather slowly so far as Pittsburgh makers are concerned. Light rails are not moving in any great volume, because the suspension of anthracite mining has not brought about much of an increase in soft coal production, and locally there has been almost no gain in mine operations. Prices are given on page 1152.

Tubular Goods.—Pipe mill operations have been maintained at the recent rate only through some building up of mill stocks. Demand for standard pipe is holding and there is good engagement of butt weld pipe capacity, but orders for oil country goods continue to taper because oil prices are not satisfactory and drilling is not so easily done in cold as in warm weather. The price situation is without change. Boiler tube business still leaves much to be desired; there is not enough tonnage to go 'round and price competition, particularly on lap welded steel tubes, is keen. Discounts are given on page 1152.

Sheets.—Advances recently announced on the ordinary finishes have been supplemented by one of $3 per ton on automobile body sheets and on long ternes, the latter finding heavy use in the making of gasoline tanks for automobiles. Automobile body sheets now are quoted at 4.40c., base (No. 22 gage), Pittsburgh, by all makers, the first announcement having been made by the American Sheet & Tin Plate Co., under date of Oct. 17. All makers have fairly heavy order books in this grade at the former price, and since recent delivery promises on new business range from six to seven weeks, it will be fully that time before makers can benefit much from the advance. The automobile builders want steel, however, and if deliveries become any more deferred, it is easy to visualize their paying the advance to get prompt service. Mills in this district do not yet claim that prices below 3.15c., base, Pittsburgh, for black, 2.30c., base, for blue annealed, and 4.30c., base, for galvanized—their present prices—have entirely disappeared, but with most makers well supplied with business, price competition is waning. The new

base on long ternes is 4.75c. for all primes; some mills have had this as a quotation for some time, but no real business has been done at above 4.60c. Prices are given on page 1152.

Tin Plate.—Good for this time of the year still describes tin plate business. The independent companies have very little business beyond the end of this month and will probably run at a slower gait in November and December, but the leading maker, between export business and the early 1926 requirements of large customers on the Pacific Coast, will probably maintain an operating rate of approximately 85 per cent. There is much interest in the price for the first half of 1926, because of the high and sustained price of pig tin, which is now 20c. per lb. higher than in April, 1923, when tin plate was established at $5.50 per base box, Pittsburgh. This adds 33c. to the cost of a base box of tin plate, or $6.60 per net ton, but the increase in that increase is fairly well offset by lower steel and labor costs.

Cold-Finished Steel Bars and Shafting.—Business is still good, but there is much complaint that present prices show little, if any, profit. An advance does not appear imminent, as many makers gave protection to their important customers on the recent decline. Prices are given on page 1152.

Steel and Iron Bars.—In this immediate territory the market is firm at 2c. base, Pittsburgh, for merchant steel bars and also for concrete reinforcing bars. But going outside this district, notably in the East, local mills find some difficulty in making sales at that price. This is particularly true on reinforcing bars, as there are a number of small makers in the East who can make a profit at less than 2c. base, Pittsburgh. The leading local maker has a heavy order book in steel bars, particularly in bars for cold finished screw stock. Independent makers also are well supplied with screw stock bar business and deliveries are more deferred than they were recently, but on ordinary merchant bars fairly prompt deliveries still are promised by several makers. Improvement in railroad buying has brought some betterment in demand for iron bars. Prices are given on page 1152.

Structural Material.—Mills in this district continue to make a strong effort to establish a minimum of 2c. base, Pittsburgh, on large structural shapes, but the need for business still is strong enough to keep the price situation rather competitive and 1.90c. is more representative of the going market. Some business is being done at 2c., base, but it usually is a small tonnage and represents a structural job that must be completed early and on which the fabricating company can obtain a fairly high price. Plain material prices are given on page 1152.

Plates.—The ruling price in this district still is 1.80c., Pittsburgh, although all makers appear desirous of getting a more profitable figure. With railroad car and locomotive buying on the increase, it should be possible for the mills to accumulate enough backlog tonnage to take a firmer price stand. Prices are given on page 1152.

Strips.—Business is active. One company in this district had combined bookings of hot and cold rolled strips in the first 17 days of the month, of more than 9000 tons, against less than 7500 tons for the entire month of September. With all makers, orders and specifications so far this month are running well ahead of the same period last month. Aside from a real need for steel by the automobile industry, the recent advance in hot rolled strips appears to be stimulating specifications on lower priced contracts. Prices are given on page 1152.

Bolts, Nuts and Rivets.—Orders for bolts and nuts are coming in steadily and prices are firm. The rivet market continues slow and easy but there are hopes for improvement in the fact that this week has brought some real railroad car and locomotive orders. Prices are given on page 1153.

Coke and Coal.—Coke prices continue to soar as the result of Eastern demands for coke as a substitute for hard coal. In the past few days producers have been getting $7.50 to $8 per net ton at ovens for run of oven coke burned for 48 hr. Coke crushed to domestic size was sold at even higher figures. Present prices for run of oven coke are just about double what they were around the first of the month, and the advance in no way reflects demands from metallurgical sources. Blast furnaces now active are covered by contracts calling for coke at about $3 per net ton at ovens, and foundries also seem to be fairly well protected over the remainder of the year at well under present prices. But inasmuch as they can sell all the 48 hr. coke they can make for domestic purposes at profitable prices, coke producers are not seeking either blast furnace or foundry outlets at the moment. If there were any demand from these sources, the price would, of course, be as high as that obtainable in the East. There is a good movement of soft coal but not much strength in prices, because of ample supplies. Prices are given on page 1153.

Old Material.—This district feels the effect of the strength of outside markets, but has not responded to it in a tangible way, because there are no new demands from users of the steel works grades. Dealers are talking of $19 and even $19.50 for heavy melting steel, but the best bid of any of the consumers here is $18. That price is not interesting to dealers, many of whom are offering $18.50 to cover against recent sales made at that price. The market has stiffened on the steel foundry grades, due to purchases inspired by a better market in railroad castings, and also is higher on turnings and borings. because of their scarcity, while heavy breakable cast has advanced $1 a ton on a few sales. High prices continue to be paid for railroad offerings. The Pennsylvania Railroad received $18.65, Vandergrift, for heavy steel scrap in its regular list. Three thousand tons of yard scrap, averaging about 40 per cent heavy melting grade, from its Conway yards, was disposed of in a supplementary list at $15.50 per net ton, delivered Canton, Ohio, this being equal to $17.35 per gross ton. The Norfolk & Western is reported to have sold steel scrap at a price equal to $19.35, at Pittsburgh, and the Baltimore & Ohio realized more than $19, Pittsburgh, for the same grade.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate as follows:

Per Gross Ton

Heavy melting steel		$18.50
No. 1 cast, cupola size	$17.50 to	18.00
Rails for rolling, Newark and Cambridge, Ohio; Cumberland, Md.; Huntington, W. Va., and Franklin, Pa.	20.00 to	20.50
Compressed sheet steel		17.50
Bundled sheets, sides and ends		16.50
Railroad knuckles and couplers	21.00 to	21.50
Railroad coil and leaf springs	21.00 to	21.50
Low phosphorus blooms and billet ends	23.00 to	23.50
Low phosphorus plate and other material	21.50 to	22.00
Low phosphorus punchings	20.00 to	20.50
Railroad malleable	18.50 to	19.00
Steel car axles	21.00 to	21.50
Cast iron wheels	17.50 to	18.00
Rolled steel wheels	21.00 to	21.50
Machine shop turnings	14.50 to	15.00
Short shoveling turnings	14.50 to	15.00
Sheet bar crops	20.00 to	21.00
Heavy steel axle turnings	16.50 to	17.00
Short mixed borings and turnings	13.50 to	14.00
Heavy breakable cast	16.50 to	17.00
Stove plate	13.50 to	14.00
Cast iron borings	14.50 to	15.00
No. 1 railroad wrought	14.50 to	15.00
No. 2 railroad wrought		18.50

Buy Hamilton Pig Iron

CHICAGO, Oct. 19.—The entire pig iron stock of the Hamilton, Ohio, blast furnace has been purchased by Hickman, Williams & Co., Chicago. It is reported that this stock, which amounts to approximately 12,000 tons of basic, foundry and malleable grades, will be offered for sale in its natural territory.

The Hostetter-Connellsville Coke Co., controlled by the H. C. Frick Coke Co., and of course paying the Frick wage scale, has ordered into production 200 ovens at its Whitney plant, located in the old Connellsville basin. These ovens have been closed since last spring.

Chicago

Bar Specifications Increase 30 Per Cent—Details of Rail Distribution

CHICAGO, Oct. 20.—Announcement of the distribution of rails recently ordered shows that Chicago producers will roll about 150,000 tons. No outstanding contracts were placed during the week, although one producer took over 15,000 tons in miscellaneous orders. Formal inquiry by the Santa Fe has not as yet been made, but it is expected by the trade that it will buy fully 75,000 tons. The week has been an unusually good one in orders for tie plates, approximately 10,000 tons having been placed with local mills. The extent of railroad equipment buying is still an unanswered question of much interest both to car builders and steel producers. In general, plates, shapes and bars are all in good demand and indications are that buyers are beginning to think about increasing stocks. One producer states that three inquiries for materials for stocking purposes totaled 27,000 tons. Automobile manufacturers continue to find use for large quantities of hot rolled strip steel and mills are experiencing some difficulty in meeting the demand.

Ingot production is unchanged, and the number of steel works blast furnaces in operation is the same as a week ago. The first cast of merchant iron from the No. 4 Iroquois blast furnace was made on Oct. 17.

Pig Iron.—Silvery in all grades has advanced $1 for delivery during the remainder of the year and $2 for first quarter shipment. Eight per cent silvery is now on a base of $28.50, Jackson County, or $33.29, delivered Chicago. This commodity is in fair demand, and a sale of 500 tons to a Chicago district automobile manufacturer is reported. Interest in foundry iron is well maintained, and both specifications and new buying are developing in good volume. The market appears to be firm at $21.50, base local furnaces, for delivery during the remainder of the year. The week has shown heavier inquiry and buying for first quarter requirements. Sellers are taking this business at current prices, although they are not anxious to see it develop too rapidly. A Milwaukee user has bought 1500 tons of Northern foundry and malleable, and a fair number of sales of foundry ranging from 200 to 1000 tons are reported. Charcoal iron is more active and remains steady at $29.04, delivered. The delivery situation remains about the same as during the previous week.

Quotations on Northern foundry, high phosphorus and malleable iron are f.o.b. local furnace, and do not include an average switching charge of 61c. per ton. Other prices are for iron delivered at consumers' yards:

Northern No. 2 foundry, sil. 1.75 to 2.25	$21.50
Northern No. 1 foundry, sil. 2.25 to 2.75	22.00
Malleable, not over 2.25 sil.	21.50
High phosphorus	21.50
Lake Superior charcoal, averaging sil. 1.50 delivered at Chicago	29.04
Southern No. 2 (all rail)	$25.51 to 26.01
Southern No. 2 (barge and rail)	23.68
Low phos., sil. 1 to 2 per cent, copper free	31.10 to 31.60
Silvery, sil. 8 per cent	33.29
Ferrosilicon, 14 to 16 per cent	45.25 to 45.75

Ferroalloys.—This market has been quiet and prices are unchanged.

We quote 80 per cent ferromanganese, $122.56, delivered; 50 per cent ferrosilicon for 1925 delivery, $85, delivered; spiegeleisen, 18 to 22 per cent, $39.76 to $40.04, delivered.

Plates.—Approximately 12,000 tons of steel for oil storage tanks is now pending in this market. A gas holder to be erected in Buffalo, requiring 5000 tons, may be fabricated at a Chicago shop. Another week has gone by and anticipation by the trade that the railroads would enter the car market in a substantial way has not materialized. One local producer has booked 3500 tons of plates, shapes and bars for cars which were awarded during the previous week. It is reported that the Havana Railways have contracted with the American Car & Foundry Co. for about 400 freight cars. Mill prices are steady at 2.10c., Chicago.

The mill quotation is 2.10c., Chicago. Jobbers quote 3.10c. for plates out of stock.

Bars.—Demand for soft steel bars continues to grow and one mill states that specifications received in October are running 30 per cent ahead of those for September, while sales show a gain of 25 per cent. This is partially accounted for by the fact that the farm machinery industry, which is enjoying an unusually good business, is a heavy user of this commodity. Deliveries are being maintained at about the same rate as during the previous week, and prices are steady at 2.10c., Chicago. Rail steel bars continue in good demand and are firm at 2c., Chicago. Producers of bar iron have had little to encourage them during the past week. Inquiry appears to have picked up somewhat, but actual buying is still in small volume. Iron bars remain at 1.90c. to 2c., Chicago.

Mill prices are: Mild steel bars, 2.10c.; common bar iron, 1.90c. to 2c., Chicago; rail steel bars, 2c., Chicago, and 2c., mill.

Jobbers quote 3c. for steel bars out of warehouse. The warehouse quotations on cold-rolled steel bars and shafting are 3.60c. for rounds and hexagons and 4.10c. for flats and squares; 4.15c. for hoops and 3.65c. for bands.

Jobbers quote hard and medium deformed steel bars at 2.60c.

Wire Products.—Prices are a trifle firmer and both new business and specifications have increased in volume during the week. Jobbers are specifying more freely and apparently are making an effort to build up stocks, which have been reported low for some time. There has been little change in the movement of field fence, and the demand for nails, which increased materially during the early part of last month, is being well maintained. Mill prices, which are unchanged, are shown on page 1152.

We quote warehouse prices f.o.b. Chicago: No. 8 black annealed wire, $3.05 per 100 lb.; common wire nails, $3.15 per keg; cement coated nails, $2.15 to $2.20.

Rails and Track Supplies.—No large orders for rails were placed during the week, although there was a fair amount of business made up of small tonnage contracts. One mill reports orders for 12,000 tons, 2500 tons and 2000 tons respectively. The distribution of a number of recent contracts is as follows: Union Pacific, 17,000 tons to the Illinois Steel Co., 18,000 tons to the Colorado Fuel & Iron Co., and 5000 tons to the Inland Steel Co.; Chicago, Milwaukee & St. Paul, 10,000 tons to the Inland Steel Co. and 40,000 tons to the Illinois Steel Co.; Northern Pacific, 15,000 tons to the Bethlehem Steel Corporation and 26,000 tons to the Illinois Steel Co. No announcement of the distribution of the New York Central tonnage has been made and the impression of the trade here is that the Baltimore & Ohio contract will be closed in the East. Estimates vary as to the tonnage which the Santa Fe will inquire for, although in all probability it will be in the neighborhood of 75,000. Producers have not had an inquiry from the Chicago, Burlington & Quincy and, if rumors prove correct, this railroad will not come into the market, for the reason that it has a fair stock of rails on hand. Buying of track fastenings has been in good volume. Tie plates placed during the week amounted to about 9000 tons. Prices on rails nd track supplies are unchanged.

Standard Bessemer and open-hearth rails, $43; light rails, rolled from billets, 1.80c. to 1.90c., f.o.b. maker's mill.

Standard railroad spikes, 2.90c. to 3c., mill; track bolts with square nuts, 3.90c. to 4c., mill; steel tie plates, 2.25c. to 2.35c., f.o.b. mill; angle bars, 2.75c., f.o.b. mill.

Jobbers quote standard spikes out of warehouse at 3.55c., base, and track bolts, 4.55c., base.

Sheets.—Demand for sheets of all grades is steady and deliveries are still somewhat extended. Advances in the price of spelter have led to speculation as to their ultimate effect upon the price of the galvanized products. Although manufacturers' stocks are said to be low, there seems to be no disposition on their part to buy very far ahead.

Chicago delivered prices from mill, 3.30c. to 3.40c. for No. 28 black, 2.45c. to 2.50c. for No. 10 blue annealed and 4.40c. to 4.45c. for No. 28 galvanized. Delivered prices at other Western points are equal to the freight from Gary plus the mill prices, which are 5c. per 100 lb. lower than the Chicago delivered prices.

Jobbers quote f.o.b. Chicago: 3.50c. base for blue annealed, 4c. base for black, and 5c. base for galvanized.

Structural Material.—Successful bids of fabricators appear to be on a more satisfactory basis than for some time past. Competition, as a general thing, is less sharp, and shops are carrying an average of about two months' work on their books. October has been a good month in tonnage placed and in the number of inquiries, and will probably compare favorably with any other month so far this year. Building activity in the Chicago district is still well maintained and there are as yet no pronounced indications of any slackening at an early date. The American Bridge Co. has booked 9000 tons of work during the week. Of this, 1400 tons was for the American Steel & Wire Co. at Cleveland, and 680 tons for a bridge for the Michigan Central at Detroit. Mill prices on plain material are firm at 2.10c., Chicago.

The mill quotation on plain material is 2.10c., Chicago. Jobbers quote 3.10c. for plain material out of warehouse.

Bolts, Nuts and Rivets.—Specifications so far in October will compare favorably with those for August, which were somewhat below the mark established by September. Demand from automobile manufacturers is still heavy. Tractor builders are also busy. The market is steady and prices are unchanged.

Jobbers quote structural rivets, 3.50c.; boiler rivets, 3.70c.; machine bolts up to ⅞ x 4 in., 55 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 4 in., 50 off; larger sizes, 50 off; hot-pressed nuts, squares, tapped or blank, $3.50 off; hot-pressed nuts, hexagons, tapped or blank, $4 off; coach or lag screws, 60 per cent off.

Cast Iron Pipe.—With pipe foundries booked ahead for five or six weeks the trade anticipates that 1925 will exceed last year both in volume of shipments and tonnage booked. Many agricultural districts which for the past few years have remained out of the market are again making normal purchases of pipe. It is usual at this time of the year for buyers to obtain price concessions on orders for winter manufacture and delivery. The present level of pig iron prices, however, has left the foundries in doubt as to just what these concessions should be and consequently none has been announced. Akron, Ohio, placed 770 tons of 4 to 20-in. Classes B and C with the United States Cast Iron Pipe & Foundry Co. Ft. Wayne, Ind., has placed 750 tons of 16-in. Class B with the National Cast Iron Pipe Co. The United States company has taken 300 tons for Mundelein, Ill. Bids on 290 tons for Staunton, Ill., will not be opened until Oct. 30. Clarendon Hills, Ill., will receive bids on 1000 tons of 6, 8 and 12-in. Class B, and Halfway, Mich., is inquiring for 3100 tons of 8, 12 and 24-in. Class C. Prices are unchanged.

Milwaukee estimates its 1926 requirements of new water mains at 35 miles of 6 to 16-in. pipe and five miles of 20 to 54-in. pipe.

We quote per net ton, f.o.b. Chicago, as follows: Water pipe, 4-in., $53.20 to $54.20; 6-in. and over, $49.20 to $50.20; Class A and gas pipe, $4 extra.

Reinforcing Bars.—Lettings so far in October have been numerous and it is probable that tonnage placed for the month will compare favorably with the record for any preceding month this year. Dealer interest is being kept at high pitch by the number of heavy tonnage projects which are now up for figures. Jobs taking less than 100 tons each continue to bulk large in the aggregate. Bar mills report that shipments are moving forward in good volume, and there appears to be a disposition upon the part of warehouses to build up stocks. Some dealers point out that improved methods of concrete placement in cold weather may keep Chicago district bar benders fairly busy throughout the winter. The warehouse price on billet steel reinforcing bars is unchanged at 2.60c., Chicago.

Lettings include:

Plibrico Co. plant, Chicago, 150 tons to Olney J. Dean & Co.

Seven bridges over the Illinois Central tracks, Grant Park, Chicago, for South Park Board, 450 tons to the Truscon Steel Co.

Public school, Fifty-eighth and Springfield Streets, Chicago, 140 tons to the Concrete Engineering Co.

School building, Marquette, Mich., 125 tons to Olney J. Dean & Co.

Addition to high school gymnasium, Waukegan, Ill., 200 tons to Olney J. Dean & Co.

Junior high school, Muskegon Heights, Mich., 100 tons to Concrete Engineering Co.

Seventeen-story cooperative apartment for Albert Swaine, Fifty-eighth Street and Stony Island Avenue, Chicago, 900 tons rail steel to Inland Steel Co.

Stark Piano Co. building, 228 South Wabash Avenue, Chicago, 274 tons to Kalman Steel Co.

Apartment building, 1320 North State Street, Chicago, 700 tons to Concrete Steel Co.

Elizabeth Arden Apartment Hotel, Chicago, 250 tons to the Concrete Steel Co.

Wausau, Wis., Central School, final unit, 150 tons to Concrete Engineering Co.

Brumm theater-store-apartment, North Milwaukee, Wis., 100 tons to Kalman Steel Co.

Addition to Milwaukee County Home for Aged, Wauwatosa, Wis., 125 tons to Kalman Steel Co.

Pending work includes:

Public school, Wellington and McVicar Streets, Chicago, 150 tons. Reinforced concrete work sublet to the Complete Artificial Stone Co.

Commodore Apartments, Chicago, 145 tons. General contractor, Adolph Lindstrom.

Junior high school, North Shore and Bosworth Street, Chicago, 500 tons. General contractor, A. & E. Anderson.

Thomas Jefferson High School, Indianapolis, Ind., 275 tons, general contract awarded to William P. Jungclaus.

Hotel, 180 East Delaware Street, Chicago, 100 tons. General contract awarded to Longacre Construction Co.

Six-story apartment building, 4826 Sheridan Road, Chicago, 180 tons. David Saul Klafter, architect.

Public school, 112th and Bishop Streets, Chicago, 160 tons. Great Lakes Construction Co., low bidder.

University of Chicago field house, Chicago, 135 tons.

Sidney Wanzer dairy plant, Chicago, 100 tons.

Billets.—Demand for small billets has increased materially during the past two weeks and prices are now firm at $35, Chicago.

Coke.—Demand for foundry coke remains unchanged and the ruling price is still $10.75, delivered in the Chicago switching district. This commodity is being watched rather closely because of the effect which the Eastern market may have upon local prices.

Old Material.—The scrap market is gradually becoming more active and prices are on the upturn for a number of grades. Several large users of scrap have again entered the market and gray iron foundries are reported to be active buyers. Dealers are making an effort to take advantage of a rise in the market and do not appear to be anxious to sell. One large user in the Chicago district is reported to have purchased 15,000 tons of heavy melting steel at $16.25. Several sales of cast iron car wheels are reported at $18 per gross ton, and railroads are said to be getting $19.25 per gross ton, delivered, for rerolling rails.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid as follows:

Per Gross Ton

Iron rails	$18.00 to $18.50
Cast iron car wheels	17.50 to 18.00
Relaying rails, 56 lb. to 60 lb.	25.00 to 26.00
Relaying rails, 65 lb. and heavier	26.00 to 31.00
Forged steel car wheels	19.25 to 19.75
Railroad tires, charging box size	19.25 to 19.75
Railroad leaf springs, cut apart	19.25 to 19.75
Rails for rolling	19.25 to 19.75
Steel rails, less than 3 ft.	19.50 to 20.00
Heavy melting steel	16.00 to 16.50
Frogs, switches and guards, cut apart	17.50 to 18.00
Shoveling steel	15.75 to 16.00
Drop forge flashings	12.00 to 12.50
Hydraulic compressed sheets	13.75 to 14.25
Axle turnings	14.00 to 14.50
Steel angle bars	18.50 to 19.00
Steel knuckles and couplers	18.75 to 19.25
Coil springs	19.50 to 20.00
Low phos. punchings	18.00 to 18.50
Machine shop turnings	9.50 to 10.00
Cast borings	12.75 to 13.25
Short shoveling turnings	12.75 to 13.25
Railroad malleable	18.50 to 19.00
Agricultural malleable	18.00 to 18.50

Per Net Ton

Iron angle and splice bars	18.25 to 18.75
Iron arch bars and transoms	21.00 to 21.50
Iron car axles	26.50 to 27.00
Steel car axles	17.50 to 18.00
No. 1 busheling	12.50 to 13.00
No. 2 busheling	9.00 to 9.50
Pipes and flues	11.00 to 11.50
No. 1 railroad wrought	14.50 to 15.00
No. 2 railroad wrought	14.25 to 14.50
No. 1 machinery cast	18.00 to 18.25
No. 1 railroad cast	16.75 to 17.25
No. 1 agricultural cast	16.75 to 17.25
Locomotive tires, smooth	16.50 to 17.00
Stove plate	14.75 to 15.25
Grate bars	14.50 to 15.00
Brake shoes	14.25 to 14.75

Cincinnati

Large Sales as Pig Iron Advances—Coke Very Active but Scrap Quiet

CINCINNATI, Oct. 20.—With indications pointing to further advances in pig iron, consumers have hastened to cover their first quarter requirements. The result has been the inception of a buying movement with sales totaling approximately 25,000 tons, the largest tonnage booked in any week this year. Although $20, base Ironton, is rapidly becoming the prevailing price on Northern foundry iron, several transactions have been closed at $19.50. It is likely, however, that the latter price will be eliminated in another week. Small lots of iron are bringing $20.50, but these are the exception rather than the rule. Tennessee iron is firm at $19, Birmingham, several sales of 300 tons each having been made at that figure. Three Alabama producers are asking $20, Birmingham, for fourth and first quarter and local sellers maintain that it is impossible for consumers to obtain a lower price. A fourth Alabama furnace is quoting $22, Birmingham, on spot business and refuses to accept orders beyond this month. Jackson County silvery furnaces have advanced their schedule $1 for fourth quarter, and are now asking $26.50 for 6 per cent. They are quoting $2 above the new prices on first quarter shipments. It is reported that the increased cost of fuel is responsible for this sudden advance. The outstanding sale of the week was 6000 tons of Northern foundry to the Standard Sanitary Mfg. Co. for delivery to its Louisville, Ky., plant. The Link-Belt Co. has taken 4500 tons of malleable for its Indianapolis foundry, dividing the business between two furnaces. Other sales included 600 tons of silvery to the American Stove Co., St. Louis, for shipment to Bedford, Ohio, and Indianapolis; 500 tons of charcoal iron to an Ohio melter; 500 tons of high silicon Alabama iron to a Michigan consumer; and 700 tons of Northern foundry to a local user. It has been disclosed that the Standard Sanitary Mfg. Co. quietly purchased a large tonnage of Southern iron several weeks ago for its Louisville, Ky., plant. The only inquiry of consequence is for 1000 tons of malleable for Michigan. The Marting Iron & Steel Co., Ironton, Ohio, has blown in its Marting furnace.

Based on freight rates of $4.05 from Birmingham and $2.27 from Ironton we quote f.o.b. Cincinnati:

Alabama fdy., sil. 1.75 to 2.25 (base)	$23.55 to $24.05
Alabama fdy., sil. 2.25 to 2.75	24.05
Tennessee fdy., sil. 1.75 to 2.25	23.05
Southern Ohio silvery, 8 per cent	28.27
Southern Ohio fdy., sil. 1.75 to 2.25	21.77 to 22.27
Southern Ohio, malleable	21.77 to 22.27

Sheets.—An unexpected demand for automobile sheets was the outstanding development of the past week. Several automobile body makers received rush orders after having completed their season's contracts, and were forced to enter the market for more sheets. Quotations are firm at 4.25c., Pittsburg. Sellers are finally winning their battle to eliminate 4.20c., Pittsburgh, as a going price on galvanized sheets and the bulk of the tonnage now being disposed of is bringing 4.30c. It is expected that within the next week it will be impossible to find a producer willing to accept less than the 4.30c. Although sales of b'ack sheets are lagging, prices are stronger and 3.15c., Pittsburgh, is the prevailing price. Blue annealed sheets show strength and it is only in isolated cases that sellers will deviate from 2.30c., Pittsburgh. The upward trend of quotations is attributed to the fact that independent mills which have been making low prices, have booked sufficient tonnage in the past month to carry them along for five or six weeks and are no longer willing to concede $1 or $2 a ton to clinch a sale. Deliveries take seven to ten days longer than they did a few weeks ago. Mills in this territory report operations at 80 per cent of capacity.

Wire Goods.—The attention of sellers is centered on the price situation, which is a most disturbing factor. An independent Ironton mill is delivering common wire nails by barge to Cincinnati for $2.65 per keg. Consumers, however, are compelled to pay transportation charges from the river bank to the ultimate destination. In most cases Eastern producers have not determined upon a definite selling policy to be followed when the Ironton company begins operation of its own barge line. Several mills are quoting $2.74, delivered here, while another company is holding to $2.79. One producer has abandoned efforts to secure business locally and will not go below $2.65, Pittsburgh, or $2.94, delivered Cincinnati. The same unsettled condition exists in plain wire. Despite the fact that the Ironton mill is seeking orders at $2.54 per 100 lb., delivered here, Eastern sellers refuse to dip below $2.59, which is equivalent to $2.30, Pittsburgh, a concession from the established quotation necessitated by circumstances peculiar to the local market. One producer will not go lower than $2.72, but admits inability to book business at that figure. It is reported that the Big Four railroad has placed its fourth quarter nail and wire requirements with a Pittsburgh mill. The city of Cincinnati is inquiring for 54,000 ft. of cable for its fire alarm telegraph system.

Bars, Plates and Shapes.—No material change in the market has occurred. Bars are firm at 2c., Pittsburgh, while shapes range from 1.90c. to 2c., Pittsburgh. Orders for single carloads of plates are being booked at 1.90c., Pittsburgh, by several producers, but consumers are still able to obtain desirable lots at 1.80c. It is reported that the New York Central railroad will buy 1400 tons of plates covering the fourth quarter needs of its subsidiary, the Big Four railroad. The Louisville & Nashville railroad is inquiring for 800 tons of plates. No important structural lettings have been made, but fabricators are engaged on numerous small jobs.

Reinforcing Bars.—The Pollak Steel Co. will supply 160 tons for two local projects. Action on 600 tons for the new factory of the Safe Cabinet Co., Marietta, Ohio, has been postponed. There is a dearth of new construction jobs. New billet bars are displaying strength at 2c., Cleveland, while rail steel bars are firm at 1.90c., mill.

Warehouse Business.—Sales have failed to maintain the pace set in September, although a respectable volume of business has been placed. Jobbers state that structural steel orders have decreased. Prices are steady with no changes recorded.

Cincinnati jobbers quote: Iron and steel bars, 3.30c.; reinforcing bars, 3.30c.; hoops, 4c. to 4.25c.; bands, 3.95c.; shapes, 3.40c.; plates, 3.40c.; cold-rolled rounds and hexagons, 3.85c.; squares, 4.35c.; open-hearth spring steel, 4.75c. to 5.75c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, 4.10c.; No. 28 galvanized sheets, 5.25c.; No. 9 annealed wire, $3 per 100 lb.; common wire nails, $2.95 per keg base; cement coated nails, $2.40 per keg; chain, $7.55 per 100 lb. base; large round head rivets, $3.75 base; small rivets, 65 per cent off list. Boiler tubes: prices net per 100 ft. lap welded steel tubes, 2-in., $18; 4-in., $38; seamless, 2-in., $19; 4-in., $39.

Coke.—Both foundry and domestic coke are more active than at any previous time this year. While the price of domestic grades remains at $7.14, delivered Cincinnati, an advance is expected Nov. 1. Announcement has been made of an advance of 50c. and $1 respectively on domestic and foundry by-product coke for Michigan delivery, effective Oct. 15. Coke from Alabama ovens is now being moved into Michigan. Dealers anticipate a higher price on by-product foundry coke next month. At present it is selling at $9.64, delivered here. A sale of 1200 tons of domestic coke is noted.

Based on freight rates of $2.14 from Ashland, Ky., $3.53 from Connellsville, $2.90 from New River ovens and $2.59 from Wise County ovens, we quote f.o.b. Cincinnati: Connellsville foundry, $9.53 to $10.53; Wise County foundry, $7.59 to $8.09; New River foundry, $10.40; by-product foundry, $9.64.

Old Material.—The market remains exceedingly quiet, with mills refusing to buy at prices asked by dealers. No. 1 machinery cast and iron axles have advanced 50c. Cincinnati dealers were successful bid-

ders for a portion of the material offered by the Louisville & Nashville and the Cincinnati Southern.

We quote dealers' buying prices, f.o.b. cars, Cincinnati:

Per Gross Ton	
Heavy melting steel	$14.00 to $14.50
Scrap rails for melting	14.00 to 14.50
Short rails	18.00 to 18.50
Relaying rails	28.00 to 28.50
Rails for rolling	15.00 to 15.50
Old car wheels	13.50 to 14.00
No. 1 locomotive tires	16.50 to 17.00
Railroad malleable	15.50 to 16.00
Agricultural malleable	15.00 to 15.50
Loose sheet clippings	9.50 to 10.00
Champion bundled sheets	11.50 to 12.00
Per Net Ton	
Cast iron borings	8.50 to 9.00
Machine shop turnings	7.50 to 8.00
No. 1 machinery cast	19.00 to 19.50
No. 1 railroad cast	15.00 to 15.50
Iron axles	23.00 to 23.50
No. 1 railroad wrought	11.50 to 12.00
Pipes and flues	8.50 to 9.50
No. 1 busheling	10.50 to 11.00
Mixed busheling	9.00 to 9.50
Burnt cast	9.50 to 10.00
Stove plate	10.50 to 11.00
Brake shoes	10.50 to 11.00

San Francisco

Despite Restricted Buying Prices Show Firmer Tendencies

SAN FRANCISCO, Oct. 17 (*By Air Mail*).—Despite the fact that there has been no large buying during the past week, prices generally have shown slightly firmer tendencies, particularly on sheets. Some of the larger sheet producers have advanced their prices about $2 a ton. This has already been reflected in local warehouse prices, sheets having been advanced 15c. per 100 lb. While no specific price change has been made in any other department of the market, Eastern mill representatives have taken a firmer stand on prices, and there is considerably less evidence of price shading. On plates, for instance, 2.25c., c.i.f. Coast ports, is apparently the minimum. The quotation of 2.20c. named a week ago by an Eastern independent has not been made since, and it is considered doubtful whether anything except a highly desirable order would be accepted below 2.25c. Fresh inquiries which have appeared during the week have not been impressive either in number or size. Sustained buying of structural steel continues as the chief feature of the market.

Pig Iron.—About 500 tons of Indian foundry iron has been received by a local importer. It is being quoted at $24 to $25. The Southern Pacific Co. is inquiring for about 1000 tons of 2.75 to 3.25 per cent silicon foundry iron. A local user has placed 1000 tons of malleable iron with a local broker. A fairly substantial number of small orders for foundry iron have been placed recently with the Utah producer, but little first quarter buying has yet been done, although a few of the larger users are understood to have contracted for their requirements. Prices are unchanged.

*Utah basic	$27.00 to $28.00
*Utah foundry, sil. 1.75 to 2.25	27.00 to 28.00
**English foundry	26.00
**Belgian foundry	24.50 to 25.00
**Dutch foundry	24.00
**Indian foundry	24.00 to 25.00
**German foundry	25.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

Shapes.—Structural lettings for the week total 1175 tons, the largest being 500 tons taken by the Wallace Equipment Co. for a Masonic Temple in Portland, Ore. The 300 tons required for an exposition building in Reno, Nev., has been placed with the McClintic-Marshall Co. Plans are expected to be out soon for an opera house in San Francisco which will require 2200 tons, and also for a War Memorial Museum which will require a similar tonnage. A new low price has appeared on Belgian plain material. Short lengths are quoted 1.65c. base, duty paid, c.i.f. Coast ports. Eastern mill prices are unchanged at 2.30c. to 2.35c., c.i.f. Coast ports.

Plates.—The people of Medford, Ore., at a referendum Oct. 6, indorsed a bond issue of $975,000 for the construction of a water supply system calling for a 38-mile pipe line from Big Butte Springs to Medford, which will require 3500 to 4000 tons of light material. The Steel Tank & Pipe Co. has taken about 100 tons for a pipe line at Portland, Ore., and the Atlantic, Gulf & Pacific Co. of Manila has placed about 100 tons with an unnamed mill, for export to the Philippine Islands. Eastern mill prices are slightly firmer at 2.25c. to 2.30c., c.i.f. Coast ports.

Bars.—Prices quoted by local reinforcing bar jobbers continue to show wide variation, ranging from 2.75c. to 3.25c. base, carload, depending on the tonnage involved, the service required and similar qualifications. As one jobber expresses it, "any price is possible under present competitive conditions, and it is therefore impossible to determine the minimum figure that is being quoted." Local mills quote soft steel bars at 2.40c., f.o.b. cars San Francisco, and Eastern mills quote 2.35c., c.i.f. dock San Francisco, but both of these prices have been shaded. Among recent reinforcing bar lettings are the following:

City Auditorium, Sacramento, Cal., 350 tons, to Truscon Steel Co.

Hotel, Tenth Street and Nevin Avenue, Richmond, Cal., 110 tons, to W. S. Wetenhall Co.

Latham Square Building, Sixteenth Street and Telegraph Avenue, Oakland, Cal., 100 tons, to an unnamed San Francisco jobber.

Sheets.—An advance of $2 a ton has been made by some of the larger producers. No large volume of business is being booked, although the local mills are fairly busy. Blue annealed sheets are quoted at 2.30c. base, Pittsburgh, black sheets at 3.20c. base, Pittsburgh, and galvanized sheets at 4.30c. base, Pittsburgh. Some of the local users are of the opinion that a fair-sized order can be placed below these quotations, but few sizable orders are being placed at present.

Warehouse Business.—Local jobbers have advanced sheet prices 15c. per 100 lb. in conformity with the higher prices being named by manufacturers. Other warehouse prices remain unchanged. Current sales are in moderate volume.

Merchant bars, $3.30 base, per 100 lb.; merchant bars, ⅝ in. and under, rounds, squares and flats, $3.80 base, per 100 lb.; soft steel bands, $4.15 base, per 100 lb.; angles, ⅞ in. and larger x 1½ in. to 2¾ in., inc., $3.30 base, per 100 lb.; channels and tees, ¾ in. to 2¾ in., inc., $3.90 base, per 100 lb.; angles, beams and channels, 3 in. and larger, $3.30 base, per 100 lb.; tees, 3 in. and larger, $3.30 base, per 100 lb.; universal mill plates, ¼ in. and heavier, stock lengths, $3.30 base, per 100 lb.; spring steel, ¼ in. and thicker, $6.30 base per 100 lb.; wire nails, $3.50 base, per 100 lb.; cement coated nails, $3 base, per 100 lb.; No. 10 blue annealed sheets, $3.85 per 100 lb.; No. 28 galvanized sheets, $5.90 per 100 lb.; No. 28 black sheets, $4.80 per 100 lb.

Steel Pipe.—The Honolulu Oil Co. is inquiring for about 1000 tons of black pipe, and is expected to close bids within the next week or 10 days. San Bernardino, Cal., will close bids Oct. 20 for about 90 tons of Matheson, 77 tons of black and 8 tons of galvanized pipe.

Cast Iron Pipe.—Los Angeles, Cal., has placed 12,000 pieces of 2-in. bell and spigot 150-lb. pressure, and 5000 pieces of 2-in. bell and thread 150-lb. pressure, tonnage unstated, with the McWane Cast Iron Pipe Co. San Bernardino, Cal., will close bids Oct. 20 for about 206 tons of 4- and 6-in. C, and Santa Ana, Cal., will close Nov. 2 for 188 tons of 4- and 6-in. B. The base price is unchanged at $50, water shipment, San Francisco.

Ferroalloys.—Several 25 and 50-ton orders have been placed recently for 80 per cent English ferromanganese, which is quoted at $117.50, duty paid incoming dock. Swedish ferrosilicon, 50 per cent, is quoted $93, duty paid incoming dock.

Coke.—An aggregate of 8000 tons of English coke has been received by two local importers, 4000 tons of which will be distributed in the Los Angeles district. There has been somewhat stronger buying recently, but prices, though steady, are unchanged.

English beehive, $15 to $16 at incoming dock, and English by-product, $12 to $14; German by-product, $11.50 to $12.

St. Louis

Stove Plants Buy 13,000 Tons of Pig Iron —Heavy Scrap Purchase

ST. LOUIS, Oct. 19.—A scramble for pig iron by stove manufacturers, who have had a rush of orders from the country, is a feature of the market. Of 15,000 tons sold during the week, about 13,000 tons went to stove plants, nearly all of it Southern iron and most of it for first quarter shipment. These were the first sales of consequence for next year's delivery. About 10,000 tons was sold by a leading Southern furnace for water and rail shipment. This producer also sold 1500 tons for fourth quarter delivery. The largest order was 1500 tons for a St. Louis stove manufacturer. About 1200 tons of Northern iron in small lots was sold by Chicago factors. The St. Louis Coke & Iron Co. is withholding quotations on first quarter business on account of the scheduled sale of its property under order of the court tomorrow. Pending inquiries total about 3000 tons. The market is strong.

We quote delivered consumers' yards, St. Louis, as follows, having added to furnace prices $2.16 freight from Chicago, $5.17 from Birmingham, all rail, and 81c. average switching charge from Granite City:

Northern fdy., sil. 1.75 to 2.25	$23.66
Northern malleable, sil. 1.75 to 2.25	23.66
Basic	23.66
Southern fdy., sil. 1.75 to 2.25	$24.17 to 25.17
Granite City iron, sil. 1.75 to 2.25	23.31 to 23.81

Coke.—The demand for coke is increasingly active. Sales last week by the Granite City by-product ovens totaled more than 20,000 tons, including both foundry and domestic grades for both prompt and nearby shipment. Shipments are still in excess of production.

Old Material.—The old material market has taken an upturn after several weeks of weakness. An East Side consumer bought 7500 tons, mostly melting and shoveling steel, which was divided among three St. Louis district dealers, and a number of other deals are pending. The whole list is stronger and some items are higher, the advances ranging from 25c. to $1.50 a ton. Railroad lists include: Northern Pacific, 2300 tons; Great Northern, 3000 tons; Baltimore & Ohio, 16,000 tons; Southern Pacific, 3000 tons; Rock Island, 5000 tons; Belt Railway of Chicago, 250 tons, and Pennsylvania System, 500 tons of 56, 64 and 85-lb. relaying rails.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Rails for rolling	18.25 to 18.50
Steel rails less than 3 ft.	18.50 to 19.00
Relaying rails, 60 lb. and under	24.00 to 24.50
Relaying rails, 70 lb. and over	30.00 to 31.00
Cast iron car wheels	17.00 to 17.50
Heavy melting steel	15.25 to 15.75
Heavy shoveling steel	15.25 to 15.75
Frogs, switches and guards cut apart	17.75 to 18.25
Railroad springs	18.50 to 19.00
Heavy axles and tire turnings	13.00 to 13.50
No. 1 locomotive tires	16.50 to 17.00
Per Net Ton	
Steel angle bars	14.75 to 15.25
Steel car axles	17.50 to 18.00
Iron car axles	24.50 to 25.00
Wrought iron bars and transoms	19.00 to 19.50
No. 1 railroad wrought	13.00 to 13.50
No. 2 railroad wrought	14.00 to 14.25
Cast iron borings	11.00 to 11.50
No. 1 busheling	12.50 to 13.00
No. 1 railroad cast	15.50 to 16.00
No. 1 machinery cast	17.00 to 17.50
Railroad malleable	14.00 to 14.50
Machine shop turnings	8.00 to 8.50
Bundled sheets	9.00 to 9.50

Finished Iron and Steel.—It is reported that the Missouri-Kansas-Texas Railway is figuring on building 500 box cars in its own shops. This work will require between 4000 and 5000 tons of steel. In addition to 3000 box cars, 10 dining cars and 10 locomotives to be let by the Missouri Pacific, that road probably will build 15 switch engines in its own shops. Six bridges to be let by the Missouri Highway Commission on Oct. 30 will require about 500 tons of structural steel. Manufacturing users of steel are still buying from hand to mouth.

For stock out of warehouse we quote: Soft steel bars, 3.15c. per lb.; iron bars, 3.15c.; structural shapes, 3.25c.; tank plates, 3.25c.; No. 10 blue annealed sheets, 3.60c.; No. 28 black sheets, cold rolled, one pass, 4.50c.; galvanized sheets, No. 28, 5.50c.; black corrugated sheets, 4.65c.; galvanized, 5.65c.; cold-rolled rounds, shafting and screw stock, 3.75c.; structural rivets, 3.65c.; boiler rivets, 3.85c.; tank rivets, $\frac{7}{8}$ in. diameter and smaller, 70 per cent off list; machine bolts, 55 per cent; carriage bolts, 50 per cent; lag screws, 60 per cent; hot pressed nuts, squares, $3.50; hexagons, blank or tapped, $4 off list.

Birmingham

Two Blast Furnaces to Go in—Open-Hearth Operations at 95 Per Cent

BIRMINGHAM, Oct. 20.—Alabama furnaces have made a number of small sales of No. 2 foundry for first quarter delivery at $20, Birmingham, and one of the smaller producers reports the sale of one and two carlots at $21. Bookings for first quarter are not yet large but indications point to heavier output of pig iron. The Republic Iron & Steel Co. will blow in a furnace, now under repairs, the first week in November which will give it two active stacks. The Tennessee Coal, Iron & Railroad Co. will put an Ensley furnace back in operation shortly, on basic iron. The surplus stock of iron on furnace yards in this immediate district is dwindling steadily and estimates made several weeks ago as to the tonnage remaining at the turn of the year will be borne out. Denial is made by several furnaces that sales are being made at $19 in this district, and agencies have been notified of an advance to $20. Twelve blast furnaces in this district are on foundry iron with 10 on basic. Every ton of basic is in demand, open hearth needs being large.

We quote per gross ton, f.o.b. Birmingham district furnaces, as follows:

No. 2 foundry, 1.75 to 2.25 sil.	$19.50 to $20.00
No. 1 foundry, 2.25 to 2.75 sil.	20.00 to 20.50
Basic	19.50 to 20.00
Charcoal, warm blast	30.00 to 32.00

Rolled Steel.—Finishing mills, fabricating plants and other industries employing steel in this district are active, with much business on their books for future delivery. Open-hearth furnace operations in this district are around 95 per cent. New orders for rails and railroad accessories are being reported every week, the rail tonnage alone for the Ensley mill of the Steel Corporation being sufficient to warrant operations through the first six months of the coming year. Other forms of steel are in good demand because of unprecedented building operations in Southern states. Soft steel bars are still quoted at 2.15c. to 2.25c., Birmingham.

Cast Iron Pipe.—Production and deliveries of cast iron pressure pipe remain heavy, with new business still coming in. Progress is reported on a contrifugal pipe shop for the American Cast Iron Pipe Co., which includes a new cupola plant. Seven cupolas will serve both the old and the new pipe shops. The recent advances on pressure pipe were anticipated, in view of increasing demand and rising iron prices. Winter buying of pipe is holding up well. Pipe, 6 in. and over in diameter, is selling at $42.

Coke.—In this market quotations continue firm, demand remains fairly good and production is increasing. The new 57-oven plant of the Republic Iron & Steel Co. will begin operations this week. Quotations of $5, Birmingham, for by-product and $5.50 for beehive foundry coke are being strictly maintained. Inquiries from outside territories are being received.

Old Material.—A large amount of iron and steel scrap is moving in this district. Dealers are purchasing considerable mixed scrap and consumers are buying in small lots. With the pig iron quotations advancing the tendency is to melt an increasing amount of old

material still. Heavy melting steel is unchanged at $13, with more of it being used than for many months.

We quote per gross ton, f.o.b. Birmingham district yards, as follows:

Cast iron borings, chemical	$15.00 to $16.00
Heavy melting steel	13.00 to 14.00
Railroad wrought	12.00 to 13.00
Steel axles	18.00 to 20.00
Iron axles	17.00 to 19.00
Steel rails	13.00 to 14.00
No. 1 cast	16.00 to 17.00
Tramcar wheels	16.00 to 17.00
Car wheels	15.00 to 16.00
Stove plate	13.00 to 14.00
Machine shop turnings	7.00 to 8.00
Cast iron borings	7.00 to 8.00
Rails for rolling	16.50 to 17.00

Buffalo

Coke Market Checks Pig Iron Sales for First Quarter—Large Scrap Orders

BUFFALO, Oct. 19.—Recent developments in the coke market are acting as a check on the first quarter selling of pig iron. In the absence of any definite idea of coke costs for that period, local makers hesitate to name future prices. One local seller is definitely considering retiring from the first quarter market. The American Radiator Co. by the end of this week will have placed 50,000 tons which represents approximately what that company will buy for the first quarter. Current inquiry is estimated at between 20,000 and 40,000 tons. One of the larger inquiries which will not come here is 14,000 tons of foundry and malleable for the General Motors Corporation. One maker has sold 10,000 tons, another 7000 tons. Prices range between $19 and $19.50 base, with a tendency toward advancing.

We quote prices f.o.b. gross ton, Buffalo, as follows:

No. 2 plain, sil. 1.75 to 2.25	$19.50 to $20.00
No. 2X foundry, sil. 2.25 to 2.75	20.50 to 21.00
No. 1 foundry, sil. 2.75 to 3.25	21.00 to 21.50
Malleable, sil. up to 2.25	19.50 to 20.00
Basic	19.00 to 19.50
Lake Superior charcoal	29.28

Finished Iron and Steel.—The situation is firmer and business is much better. Bars are firm at 2.265c. and shapes are fairly steady at 2.165c., delivered Buffalo. Wire business continues in good volume. The reinforcing bar market was rather quiet during the week. A Packard automobile building, to comprise a sales office and warehouse, is among the projects listed. This job will take 200 tons. Carroll Brothers, Clarence, N. Y., will build a sand and gravel plant addition, 50 tons. Warehouse business continues at the rate of the first part of the month, which was one of the best periods of 1925.

Warehouse prices are being quoted as follows: Steel bars, 3.25c.; steel shapes, 3.35c.; steel plates, 3.35c.; No. 10 blue annealed sheets, 3.80c.; No. 28 black sheets, 4.75c.; No. 28 galvanized, 5.45c.; cold rolled shapes, 4.40c.; cold rolled rounds, 3.95c.; wire nails, 4c.; black wire, 4.05c.

Old Material.—Within the past week two local mills have bought approximately 10,000 tons of heavy melting steel at $18.50, and buying continues with one other large consumer due to place its requirements any day. The market is growing stronger, with some dealers endeavoring to obtain $19 and some $19.50. One local mill bought machine shop turnings at $12.50 to $13, and dealers are offering $12 for material against that purchase. A sale of mixed turnings and borings is reported at $13.50. Cast scrap buying still lags, and there is little demand for the specialties.

We quote prices f.o.b. gross ton, Buffalo, as follows:

Heavy melting steel	$18.50 to $19.00
Low phosphorus	20.00 to 20.50
No. 1 railroad wrought	16.50 to 17.00
Car wheels	16.50 to 17.50
Machine shop turnings	12.00 to 12.50
Cast iron borings	13.00 to 13.50
No. 1 busheling	16.50 to 17.00
Stove plate	15.00
Grate bars	14.50 to 15.00
Hand bundled sheets	13.00 to 13.50
Hydraulic compressed	16.50 to 17.50
No. 1 machinery cast	16.50 to 17.00
Railroad malleable	19.50 to 20.00
No. 1 cast scrap	17.00 to 17.50
Iron axles	26.00 to 27.00
Steel axles	20.00 to 20.50

New York

Heavy Pig Iron Buying as Coke Advances —Plates Easier at 1.60c., Pittsburgh

NEW YORK, Oct. 20.—The sharp advances in coke have had opposite effects on producers and buyers. Furnaces show increasing hesitancy in assuming forward obligations because of the uncertainty of their fuel costs. A number of eastern Pennsylvania furnaces are not quoting on first quarter deliveries and at least one producer has withdrawn from the market entirely. A New York State furnace which has been contemplating going in is finding the fuel problem a serious obstacle. Buyers, on the other hand, fearing that high coke will bring still further advances in pig iron, are hastening to cover their needs for first quarter. This is especially true of the larger consumers. The American Radiator Co. has closed for 15,000 tons of foundry for first quarter delivery to its Bayonne, N. J., plant, while the Richmond Radiator Co. has placed 5000 tons of foundry for the first quarter requirements of its Uniontown, Pa., works. The latter tonnage is understood to have been bought at $19.50 base, Valley furnace. Outside of these two transactions, sales of the week in this district totaled close to 10,000 tons. Louis Sacks, Inc., Newark, N. J., purchased 1400 tons of foundry and malleable for first quarter, placing 800 tons with a Buffalo furnace and the remainder with eastern Pennsylvania producers. The Kennedy Valve Mfg. Co., Elmira, N. Y., is in the market for 400 to 500 tons of foundry and malleable for first quarter, and a New England melter is inquiring for 1000 tons of foreign iron for the same delivery. The Worthington Pump & Machinery Corporation wants 300 tons of mixed foundry grades for prompt shipment to its East Cambridge, Mass., and Holyoke plants, and 400 tons of low silicon foundry for its Laidlaw works, Elmwood Place, Ohio. A New Jersey user is in the market for 1500 tons of foundry. Prices are stronger. It is doubtful whether less than $19, base Buffalo, or $21, base eastern Pennsylvania furnace, can be done even on prompt shipments. In fact, higher prices have just been announced by Buffalo producers, indicating their increasing alarm over the fuel situation.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $4.91 from Buffalo and $5.54 from Virginia:

East. Pa. No. 2, sil. 1.75 to 2.25	$23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.02
East. Pa. No. 1X fdy., sil. 2.75 to 3.25	24.52
Buffalo, sil. 1.75 to 2.25 (all rail)	$23.91 to 24.41
Buffalo, sil. 1.75 to 2.25 (by barge canal del'd alongside in lighterage limits N. Y. and Brooklyn)	21.75 to 22.25
No. 2 Virginia, sil. 1.75 to 2.25	29.54

Ferroalloys.—Sales of two lots of ferromanganese of 100 and 200 tons respectively are noted. There has also been the usual business in small and carload lots. No large inquiries are before the market, although sellers believe that consumers must purchase considerable ferromanganese for use this year. All the business done has been at the full price of $115, seaboard. Ferromanganese made in India containing a maximum of 75 per cent manganese is being offered, but sales of only one or two carloads are reported. The spiegeleisen market is quiet, with sales confined to small and carload lots and with consumers buying only for their immediate needs. Specifications on contract for 50 per cent ferrosilicon and standard ferrochromium are very heavy. Prices for next year's contracts for these two alloys have not yet been determined upon and no attempt has yet been made to line up business for next year.

Warehouse Business.—One of the outstanding features of the market in the past week was the moderately heavy movement of structural steel and reinforcing bars. Black and galvanized sheets were also in better demand than for some time and prices showed

considerable firmness. Today, the minimum on sheets is 4c. per lb. for black and 5c. per lb. for galvanized. The price of 3.24c. per lb. base on bars is rapidly becoming the minimum, although isolated instances of concessions of a few cents per 100 lb. are still reported. Tin, copper, zinc, lead and other non-ferrous metals are all firmer with slight advances in price reported in some instances. Wrought iron and steel pipe continues slightly unstable, although the tendency is apparently toward greater strength. Bolts still exhibit slight weakness in prices, while coach and wood screws are firm with little prospect of any reduction. Prices on page 1164. We quote boiler tubes per 100 ft. as follows:

Lap welded steel tubes, 2-in., $17.33; seamless steel, 2-in., $20.24; charcoal iron, 2-in., $25; 4-in., $67.

Finished Iron and Steel.—Excepting plates, steel products are generally firm at the quotations published in these columns a week ago. Sharper competition has developed among Eastern plate mills and sales of carload lots have been made at 1.60c., Pittsburgh basis, within the past few days. Two weeks ago 1.60c. was a special price given to large buyers in a few instances, but a week ago there were numerous sales at 1.65c. and this week sales at 1.60c. are common. Sheets seem to be holding very well at 4.30c. for galvanized, 3.15c. for black and 2.30c. for blue annealed, all Pittsburgh basis. If there is any cutting it is on black sheets; there appeared to be some indication today that some sales had been made at 3.10c. within the past week. On steel bars, 2c., Pittsburgh, is firm, but most of the larger users covered for their fourth quarter requirements at 1.90c. before the advance. Structural steel tonnage is still running into large figures in the New York district, being about equal to that of September, which was one of the best months of the year. Bids have gone in on the large office building to be erected in the Grand Central zone by Eastern Offices, Inc., and the award of the steel, about 25,000 tons, will probably be announced soon. Another large office building now up for bids is that to be erected for the Royal Indemnity Insurance Co. at 150 William Street, New York, involving 5500 tons. An Elks' club in Brooklyn will take 3000 tons.

We quote for mill shipments, New York delivery, as follows: Soft steel bars, 2.34c.; plates, 1.94c. to 2.14c.; structural shapes, 2.14c. to 2.24c.; bar iron, 2.14c. to 2.24c.

Cast Iron Pipe.—Gas company purchasing is still the feature of the market on bell and spigot pipe. Prices are reported firmer than for some time. A move has been made to vacate the "taxpayer's" injunction to prevent New York from awarding pipe only to the lowest American bidders. On the recent inquiry of the Department of Water Supply, Gas and Electricity, New York, covering a contract for purchasing and laying 2400 tons of 6 to 20-in. pipe, the Beaver Construction Co. was low bidder and received the award. The Stamny Construction Co., Brooklyn, N. Y., received the award for laying 2400 tons of pipe at Huntington, L. I., the pipe to be purchased by the contractor. A more stable tendency is evident in the soil pipe market and with less inclination to offer concessions, a slight advance is expected.

We quote pressure pipe per net ton, f.o.b. New York, in carload lots, as follows: 6-in. and larger, $50.60 to $51.60; 4-in. and 5-in., $55.60 and $56.60; 3-in., $65.60 to $66.60, with $5 additional for Class A and gas pipe. Discounts of both Northern and Southern makers of soil pipe, f.o.b. New York, are as follows: 6-in., 45 to 50 per cent off list; heavy, 55 to 60 per cent off list.

Coke.—The upward movement of the coke market is so rapid as a result of the unprecedented demand developed by the coal strike, that it is difficult to establish a market price. Domestic sizes have advanced to about $10 per ton, Connellsville, while foundry is quoted at about $8 and furnace about $7.50 per ton, Connellsville. Foundries not covered with contracts are reported encountering serious difficulty in securing sufficient tonnage. Some British coke is reported to have been sold to American consumers to arrive in the next few weeks. In one instance a gas company is claimed to have purchased about 3500 tons from a British source. By-product prices in this district continue unchanged at $10.41 per ton, delivered Newark or Jersey City, N. J., but an advance is expected by the end of this month.

Old Material.—All grades continue unchanged with only moderate activity among brokers. No. 1 heavy melting steel is still being purchased at $16 to $16.50 per ton, delivered Eastern Pennsylvania, with one large broker paying up to $17 per ton on one contract. At present buying prices the volume of material coming out is not large and brokers question the possibility of consumers purchasing any but small quantities at prices based on the current buying market. However, brokers are apparently ready enough to contract for small tonnages at the present level.

Buying prices per gross ton New York follow:

Heavy melting steel (yard)	$11.50 to $12.00
Heavy melting steel (railroad or equivalent)	13.00 to 13.50
Rails for rolling	14.25 to 14.75
Relaying rails, nominal	23.00 to 24.00
Steel car axles	21.50 to 22.00
Iron car axles	24.00 to 24.50
No. 1 railroad wrought	14.50 to 15.00
Forge fire	10.00 to 10.75
No. 1 yard wrought, long	13.50 to 14.00
Cast borings (steel mill)	9.75 to 10.25
Cast borings (chemical)	13.00 to 14.00
Machine shop turnings	10.00 to 10.50
Mixed borings and turnings	9.75 to 10.25
Iron and steel pipe (1 in. diam., not under 2 ft. long)	12.25 to 12.75
Stove plate	10.50 to 11.75
Locomotive grate bars	11.00 to 11.50
Malleable cast (railroad)	15.50 to 16.00
Cast iron car wheels	14.00 to 14.50
No. 1 heavy breakable cast	13.00 to 14.00

Prices which dealers in New York and Brooklyn are quoting to local foundries per gross ton follow:

No. 1 machinery cast	$18.00 to $18.50
No. 1 heavy cast (columns, building material, etc.), cupola size	16.50 to 17.00
No. 2 cast (radiators, cast boilers, etc.)	15.50 to 16.00

Boston

Little Pig Iron Selling at Higher Prices—Coke Is Very Active

BOSTON, Oct. 20.—Buffalo district pig iron is now firmly held at $19.50, furnace, for No. 2 plain, or $24.41, delivered, and No. 2X at $20, furnace, or $24.91, delivered. Alabama iron has advanced from $28.60 to $29.10, delivered, for No. 2 plain, to $29.60, with regular 50c. differentials. New York State furnace prices are also growing stronger. Buying of iron has dropped to small proportions, however, as most melters have covered their 1925 and some their first quarter requirements at prices $1 to $1.50 under those quoted today. A Troy, N. Y., furnace, which will probably be blown in next month, has booked business in New England for November, December and first quarter delivery at $19, base furnace. This stack has a marked advantage over Buffalo district furnaces in freight rates into New England. Efforts to boost Continental irons have not been successful in this territory, the prevailing price still being $22 a ton on dock Boston, duty paid. Little Indian iron is available; consequently it is difficult to get a line on prices.

We quote delivered prices on the basis of the latest sales as follows, having added $3.65 freight from eastern Pennsylvania, $4.91 from Buffalo, $5.92 from Virginia, and $9.60 from Alabama:

East. Penn., sil. 1.75 to 2.25	$24.65 to $25.15
East. Penn., sil. 2.25 to 2.75	25.15 to 25.65
Buffalo, sil. 1.75 to 2.25	24.41
Buffalo, sil. 2.25 to 2.75	24.91
Virginia, sil. 1.75 to 2.25	28.92 to 29.42
Virginia, sil. 2.25 to 2.75	29.42 to 29.92
Alabama, sil. 1.75 to 2.25	29.60
Alabama, sil. 2.25 to 2.75	30.10

Cast Iron Pipe.—Fitchburg, Mass., has awarded 125 tons of 10-in. pipe to the Warren Foundry & Machine Co. This was the only municipal letting during the past fortnight. It is reported, but unconfirmed, that the same foundry took a large gas pipe order from a central Massachusetts company. Several of the New England gas companies are feeling out the market with a view to placing orders for pipe to be used next spring. Private cast iron pipe business is fairly good. Prices quoted openly for domestic pipe follow: 4-in., $60.10 a ton, delivered at common Boston freight rate points; 6-in. to 16-in., $56.10; 20-in. and larger, $55.10.

Coke.—Because of the scarcity of anthracite, more domestic coke is being made and sold in New England than ever before. New England producers are several months behind on deliveries; consequently the demand for Connellsville district fuel is growing very fast. Most of the recent sales of Connellsville were at $8 on cars at the ovens, or $13.54, delivered. Some coal dealers are buying Connellsville furnace coke and screening it at their yards. A Troy, N. Y., oven, which pulled its first coke during the latter part of last week, has invaded the New England market and booked some substantial tonnages. In Boston the retail delivered price on domestic coke is being held at $13 by the New England Coal & Coke Co., but the price varies widely in other parts of New England. For instance, in Providence, R. I., it is $14.25 a ton delivered, while in Lowell, Mass., it is $15. Shipments of New England made foundry coke are about on a par with those for last month. Both the New England Coal & Coke Co. and the Providence Gas Co. quote such fuel at $12 a ton, delivered, where the freight rate does not exceed $3.10.

Old Material.—Scrap is moving a little more freely. Some yards, forced to move to new locations, are anxious to dispose of as much material as possible, while others are selling in anticipation of snow. Heavy melting steel is selling at $11.50 to $12 on cars shipping point for local consumption, and at $12 to $12.50 for Pennsylvania consumption. Cotton ties are scarce and higher, while the market for shafting and axles is off about $1, and the largest buyer of stove plate has dropped his price 25c. Textile machinery is not bringing quite as much as heretofore, but No. 1 machinery cast is somewhat stronger. On material which it recently offered the Boston & Albany Railroad secured prices generally higher than those quoted below. The Maine Central and Portland Terminal Co. on Oct. 13 closed bids on 7000 to 7500 tons of miscellaneous material, but details as to prices are lacking. On Oct. 23 the Boston & Maine Railroad will close bids on about 80 cars of miscellaneous scrap.

The following prices are for gross ton lots delivered consuming points:

Textile cast	$20.00 to $20.50
No. 1 machinery cast	19.50 to 20.00
No. 2 machinery cast	15.50 to 16.50
Stove plate	13.50 to 14.25
Railroad malleable	19.00 to 19.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$11.50 to $12.50
No. 1 railroad wrought	12.50 to 13.00
No. 1 yard wrought	11.50 to 12.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	11.50 to 12.00
Machine shop turnings	9.00 to 9.50
Cast iron borings, chemical	11.50 to 12.00
Cast iron borings, rolling mill	9.00 to 9.50
Blast furnace borings and turnings	8.50 to 9.00
Forged scrap	9.00 to 9.50
Bundled skeleton, long	9.00 to 9.50
Forged flashings	9.50 to 10.00
Bundled cotton ties, long	9.50 to 10.00
Bundled cotton ties, short	10.00 to 10.50
Shaftings	18.00 to 18.50
Street car axles	18.00 to 18.50
Rails for rerolling	12.50 to 13.00
Scrap rails	11.50 to 12.50

Advances in Old Material at Detroit

DETROIT, Oct. 20.—Purchases of considerable tonnage of waste material in the Youngstown district has been reflected in the local market, with the result that heavy melting and shoveling steel, borings and short turnings and hydraulic compressed have registered an advance during the past week. Holdups continue on machine shop turnings but the general tone of the market is strong.

The following prices are quoted on a gross ton basis f.o.b. producers' yards, excepting stove plate, No. 1 machinery cast and automobile cast, which are quoted on a net ton basis:

Heavy melting and shoveling steel	$14.75 to $15.25
Borings and short turnings	11.50 to 12.00
Long turnings	10.00 to 10.50
No. 1 machinery cast	15.00 to 16.00
Automobile cast	22.00 to 23.00
Hydraulic compressed	13.25 to 13.75
Stove plate	12.50 to 13.00
No. 1 busheling	12.75 to 13.25
Sheet clippings	8.75 to 9.25
Flashings	12.50 to 13.00

Philadelphia

Pennsylvania Buys 30,000 Tons of Car Material—B. & O. Inquires for Rails

PHILADELPHIA, Oct. 20.—The Pennsylvania Railroad has placed an order for 30,000 tons or more of plates, shapes and bars with the Carnegie Steel Co. to provide material to car companies which recently received contracts for the repair of 6000 hopper cars. The Pennsylvania also ordered a few thousand tons of plates for its own shops at Altoona, Pa., where 2000 or 3000 cars will be repaired.

The Baltimore & Ohio Railroad has inquired for 75,000 tons of 100 and 130-lb. rails, but no other roads of this district have come into the market for their 1926 rail requirements. Reports that the Pennsylvania had inquired for 200,000 tons and the Reading for 25,000 tons are incorrect.

Increasing demand for coke for domestic heating purposes and consequent shortage for metallurgical uses has brought further contraction of pig iron selling by domestic furnaces, all of which have practically withdrawn from the market except on small lots for early shipment. Melters are anxious to cover for first quarter, but in numerous instances have been turned down. Meanwhile the bulk of pig iron sales are of foreign iron.

Pig Iron.—The coke situation is the key to the pig iron market. With $8.50 and $9 per ton, Connellsville ovens, now being paid for coke for domestic heating purposes, oven operators are not anxious to quote on blast furnace or foundry coke. A few cars of furnace coke available a day or two ago were quoted at $7. Most of the coke operators have withdrawn from the market on metallurgical coke and when a user is in urgent need special negotiations are in order before the demand can be supplied. Under this condition Eastern furnaces do not feel disposed to sell iron for first quarter and are subject to some embarrassment in declining to quote regular customers who are now most anxious to cover for at least a part of their requirements for that period. So far as fourth quarter is concerned, there is comparatively little demand, but some melters are ordering when they can for November-December delivery with the hope of deferring shipment into next year. One furnace reports having been offered $22, base, furnace, for first quarter iron, but declined it. Another furnace has quoted $22 for No. 2 plain and $22.50, furnace, for No. 2X, but has explained to customers that it would prefer not to quote at all. Foreign iron of analyses corresponding to No. 2 plain and No. 2X is being sold at $21, c.i.f. duty paid, Philadelphia. There is no disposition on the part of foreign sellers to decline to sell ahead and as a result they are taking quite a bit of first quarter business as well as for earlier delivery. The J. L. Mott Iron Works, Trenton, N. J., is in the market for 800 tons of iron for November shipment.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia and include freight rates varying from 76c. to $1.63 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$22.26 to $22.63
East. Pa. No. 2X, 2.25 to 2.75 sil.	22.76 to 23.13
East. Pa. No. 1X	23.26 to 23.63
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.67 to 28.67
Virginia No. 2X, 2.25 to 2.75 sil.	28.17 to 29.17
Basic delivery eastern Pa.	21.00 to 21.50
Gray forge	21.00 to 22.00
Malleable	22.50 to 23.00
Standard low phos. (f.o.b. furnace)	22.00 to 24.00
Copper bearing low phos. (f.o.b. furnace)	22.50 to 23.50

Ferroalloys.—Ferromanganese is firm at $115, seaboard or furnace, on both foreign and domestic material. Sales are confined to small lots for early shipment.

Billets.—Prices on billets are reported to be firmer. Recent sales at below $35 for rerolling billets and below $40 for forging billets, Pittsburgh base, have not been duplicated in the past week.

Plates.—The plate tonnage is each week becoming

slightly more plentiful, but prices continue weak at Eastern mills. Many of the current sales of carload lots or more are at 1.65c., Pittsburgh, with an occasional quotation of 1.60c. Small lots are being sold at 1.70c., with one mill quoting 1.80c. on less than carloads.

Shapes.—There are few large structural steel jobs pending in this district, but there is an abundance of small ones. October tonnage is expected to equal and perhaps will exceed that of September. The larger producers are quoting 1.90c., Pittsburgh, but some Eastern mills have named lower figures within the week, usually $1 or $2 a ton less.

Bars.—Steel bars appear to be firmer this week at 2c., Pittsburgh. Mills are less anxious for business, as most of them have better backlogs and deliveries have been extended on some sizes to four or five weeks. On the common sizes the usual deliveries are three to four weeks, anything less than three weeks now being exceptional. The Penn Seaboard Steel Corporation, which is concentrating its steel making at New Castle, Del., will have its new 16-in. bar mill in operation in January. A 10-in. and a 12-in. mill, also to be installed, will not be ready until a later date. Bar iron remains at 2.12c. to 2.17c., Philadelphia.

Sheets.—Eastern makers of sheets are holding firmly to the new prices, namely, 2.30c. on blue annealed, 3.15c. on black and 4.30c. on galvanized, Pittsburgh base, and presumably the Pittsburgh and Ohio mills selling in this district are doing likewise, as there have been no reports of concessions from these figures.

Warehouse Business.—Business is in better volume and prices are holding at the figures quoted below, which apply on local deliveries only:

> Soft steel bars and small shapes, 3.20c.; iron bars (except bands), 3.20c.; round edge iron, 3.50c.; round edge steel, iron finished, 1½ x ½ in., 3.50c.; round edge steel planished, 4.30c.; tank steel plates, ¼ in. and heavier, 2.80c. to 3c.; tank steel plates, ⅜ in., 3c.; blue annealed steel sheets, No. 10 gage, 3.35c.; black sheets, No. 28 gage, 4.35c.; galvanized sheets, No. 28 gage, 5.45c.; square, twisted and deformed steel bars, 3c.; structural shapes, 2.75c. to 2.90c.; diamond pattern plates, ¼ in., 5.30c.; ⅛ in., 5.50c.; spring steel, 5c.; rounds and hexagons, cold-rolled steel, 3.90c.; squares and flats, cold-rolled steel, 4.40c.; steel hoops, 4.25c. base; steel bands, No. 12 gage to ⅜ in., inclusive, 3.90c.; rails, 3.20c.; tool steel, 8.50c.; Norway iron, 6.50c.

Imports.—Last week's imports of metals included 2852 tons of pig iron from India, 149 tons of sheets from Belgium, 98 tons of muck bar from Sweden and 739 tons of scrap from Cuba.

Old Material.—There have been no price changes on scrap within the week except on heavy melting steel, which is firmer and 50c. higher. A nearby mill, whose offering price had been $16.50, was unable to get steel scrap at this price and was equally unsuccessful at $17, so raised its price to $17.50, at which it bought a few thousand tons. Some brokers were unwilling to sell at less than $18.

We quote for delivery, consuming points in this district, as follows:

No. 1 heavy melting steel	$17.00 to $17.50
Scrap rails	17.00 to 17.50
Steel rails for rolling	18.00 to 18.50
No. 1 low phos. heavy 0.04 and under	21.50 to 22.00
Couplers and knuckles	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Cast iron car wheels	18.50 to 19.00
No. 1 railroad wrought	18.00 to 18.50
No. 1 yard wrought	17.00 to 17.50
No. 1 forge fire	14.00 to 14.50
Bundled sheets (for steel works)	14.00
Mixed borings and turnings (for blast furnace use)	13.50 to 14.00
Machine shop turnings (for steel works use)	14.00
Machine shop turnings (for rolling mill use)	14.50 to 15.00
Heavy axle turnings (or equivalent)	15.00 to 15.50
Cast borings (for steel works and rolling mill)	14.00 to 14.50
Cast borings (for chemical plant)	16.00 to 16.50
No. 1 cast	18.00 to 18.50
Heavy breakable cast (for steel plants)	17.00 to 17.50
Railroad grate bars	14.50
Stove plate (for steel plant use)	14.50
Wrought iron and soft steel pipes and tubes (new specifications)	16.50
Shafting	23.00 to 24.00
Steel axles	24.00 to 25.00

Cleveland

Large Pig Iron Purchases Follow Rise in Coke—Scrap Advances

CLEVELAND, Oct. 20.—Demand for finished steel is well maintained with October bookings about the same as those of September. Some inquiry has come from automobile parts manufacturers for steel bar contracts for the first quarter, but mills are not yet ready to quote for that delivery. Promptness of deliveries has become a factor with some consumers who are able to secure shipments of steel bars in two weeks, although deliveries by some of the mills are more extended. Two or three Detroit automobile manufacturers have made slight curtailments in production, but others are still operating their plants at capacity and the Ford Motor Co. is reported to have gotten up to a production of 8600 cars a day. Inquiry in the structural field continues light. Railroad buying shows more life. The Lima Locomotive Works has been awarded 25 locomotives by the New York Central Railroad, and has taken 10 switch engines for the Hocking Valley. There is no particular change in the price situation. Steel bars are firm in this market at 2c., Pittsburgh.

Mills are still endeavoring to establish structural material on a 2c. basis, but 1.90c., Pittsburgh, still appears to be the more common price for good-sized lots. Plates are steady at 1.80c., Pittsburgh, with no sales reported at higher prices except small lots.

> Jobbers quote steel bars, 3.10c.; plates and structural shapes, 3.20c.; No. 28 black sheets, 3.80c.; No. 28 galvanized sheets, 4.95c.; No. 10 blue annealed sheets, 3c.; cold-rolled rounds and hexagons, 3.80c.; flats and squares, 4.30c.; hoops and bands, 3.85c.; No. 9 annealed wire, $3 per 100 lb.; No. 9 galvanized wire, $3.45 per 100 lb.; common wire nails, $3 base per 100 lb.

Pig Iron.—The volume of business has increased and a fairly good buying movement for the first quarter appears under way. While considerable fourth quarter business was taken during the week, approximately 75 per cent of the tonnage booked by some producers was for the more extended delivery. Evidently the coke situation is stimulating forward buying. Sales by Cleveland interests during the week aggregated 60,000 tons and a good volume of inquiry is still pending. The market generally is firmer. In the Valley district $19.50 has become the common quotation on foundry and malleable iron, although $19 has not entirely disappeared. Valley makers are now asking $19 for basic iron. In Cleveland the price is unchanged at $20, furnace, for local delivery and $19.50 for outside shipment. Neither of the local producers has opened books for the first quarter. A Buffalo producer has advanced to $19.50 on foundry and malleable grades. One lot of 1200 tons of malleable iron was taken at that price. The market in the Detroit territory is firm at $21. The Buick Motor Co., which inquired for 14,000 tons of foundry iron, will secure a portion of that tonnage from Detroit furnaces. The Link-Belt Co. has closed for 5000 tons of malleable iron for its Indianapolis plant. It is reported that the business went to a Columbus, Ohio, furnace. The American Radiator Co. placed 4500 tons for its Springfield, Ohio, plant. Shipments continue heavy. Stocks of merchant pig iron in furnace yards were reduced approximately 75,000 tons in September, and it is stated that stocks are now lower than at any time since July, 1923. Another advance of $1 a ton has been made on Ohio silvery iron, making 8 per cent $28.50 at furnace. An additional advance of $2 a ton has been made for the first quarter.

Quotations below, except on basic and low phosphorus iron, are delivered Cleveland, and for local iron include a 50c. switching charge. Ohio silvery and Southern iron prices are based on a $3.02 freight rate from Jackson and $6.01 from Birmingham:

Basic, Valley furnace	$18.50
N'th'n No. 2 fdy., sil. 1.75 to 2.25	20.50
Southern fdy., sil. 1.75 to 2.25	$25.01 to 25.51
Malleable	20.50
Ohio silvery, 8 per cent	31.52
Standard low phos., Valley furnace	27.00 to 27.50

Iron Ore.—Consumption of Lake Superior ore during September amounted to 4,010,826 tons, as compared with 4,020,280 tons during August, the slight falling off being due to the shorter month. The amount consumed in September a year ago was 2,927,102 tons. The amount on hand at furnaces Oct. 1 was 31,407,639 tons. The total amount at furnaces and Lake Erie docks Oct. 1 was 38,423,322 tons, as compared with 38,997,921 tons on Oct. 1 last year. On Sept. 30 there were 170 furnaces in blast using Lake ore, an increase of nine for the month. Furnaces in the central district consumed 2,110,665 tons in September, an increase of 57,938 tons; Eastern furnaces consumed 86,830 tons, a decrease of 19,188 tons; Lake furnaces consumed 1,702,331 tons, a decrease of 37,594 tons, and all-rail furnaces consumed 111,000 tons, a decrease of 10,610 tons.

Semi-Finished Steel.—Sheet bar specifications are heavy, but there is very little new inquiry as consumers generally are under contract. Consumers maintain they can buy sheet bars from Pittsburgh district mills at $33.50, Pittsburgh, or at the ruling price in Youngstown. This is also the Youngstown price for billets and slabs.

Sheets.—Leading makers have advanced automobile body sheets $3 a ton to 4.40c., Pittsburgh. As most consumers are well covered for the fourth quarter, the advance is regarded largely as a prior notice to consumers that they will be expected to pay more for the first quarter. Buyers of other grades of sheets are also well covered with orders placed before the recent advances. The general tone of the market is firm and most mills have sufficient orders to keep them operating 30 days or more. However, weak spots are still in evidence on black sheets, on which 3.05c. has not disappeared for quick shipment although the ruling range is from 3.10c. to 3.15c. Blue annealed sheets are commonly quoted at 2.30c., Pittsburgh, although some mills will still take orders at the same price with a Youngstown basing point. Galvanized sheets are well established at 4.30c.

Reinforcing Bars.—The rail steel bar market is firmer, with most mills holding to a minimum of 1.80c. for round lots. New demand is light. An inquiry is out for 200 tons for a structure for the Building Transportation Co., Cleveland.

Strip Steel.—A leading producer has marked up its prices on hot rolled strip steel to the higher quotations that were placed in effect a few days ago by several other mills and the market appears to be established at the advance. Cold rolled strip is unchanged at 3.75c., Cleveland.

Alloy Steel.—Advances on alloy steel bars were placed in effect this week by some of the producers. These advances are on all items except chrome molybdenum. Generally prices are $2.50 to $5 a ton higher, but the price situation is not yet entirely cleared up.

Bolts, Nuts and Rivets.—Specifications for bolts and nuts continue to come out in very good volume, but manufacturers would like more business. Demand from the automotive industry is heavy. Prices are firm. Demand for rivets continues light and the market still lacks strength.

Coke.—The flurry in coke continues as a result of the heavy Eastern demand for domestic use. Ohio by-product coke has been sold at $8.50 a ton, an advance of $1.50 during the week, and producers state that they could sell considerable tonnage at that price. They are now asking $9. Producers have withdrawn quotations on Connellsville foundry coke. The last reported sale was at $5.75 and the last reported quotation was $7. Connellsville heating coke has been sold at $6.50.

Old Material.—The market is active in steel-making grades and prices are higher. A Cleveland mill has purchased 10,000 tons of heavy melting steel for delivery extending through the first quarter, and purchases by Canton and Massillon mills are also reported. Dealers have paid $18 a ton for small lots of heavy melting steel to cover against the Cleveland order, but are now offering only $17.50 to $17.75. Heavy melting steel is quoted at $18.50 for delivery in Canton, Massillon and Warren. Prices have advanced 25c. to $1 a ton on about all grades and the market is firm. Offerings are not large as considerable scrap is being held back for higher prices.

We quote dealers' prices f.o.b. Cleveland per gross ton:

Heavy melting steel	$17.25 to $17.75
Rails for rolling	16.75 to 17.00
Rails under 3 ft	19.50 to 20.00
Low phosphorus melting	19.00 to 19.25
Cast iron borings	14.00 to 14.25
Machine shop turnings	12.50 to 12.75
Mixed borings and short turnings	14.00 to 14.25
Compressed sheet steel	15.25 to 15.50
Railroad wrought	14.00 to 14.25
Railroad malleable	19.50 to 20.00
Light bundled sheet stampings	12.25 to 12.50
Steel axle turnings	15.25 to 15.50
No. 1 cast	18.00 to 18.50
No. 1 busheling	13.75 to 14.00
Drop forge flashings	13.50 to 14.00
Railroad grate bars	13.50 to 13.75
Stove plate	13.50 to 13.75
Pipes and flues	11.25 to 11.50

September Bookings of Commercial Steel Castings

Steel castings booked in September are reported by the Department of Commerce at only 48,827 net tons, or 48.6 per cent of capacity, based on reports from more than two-thirds of the industry. The distribution was 17,008 tons of railroad specialties (39.6 per cent of capacity) and 31,819 tons of miscellaneous castings (55.4 per cent). Except for last June, which was less than 1 per cent lower, the September figures are the lowest in more than a year. August showed 51,358 tons (18,235 tons of railroad specialties and 33,123 tons of miscellaneous castings); while for September, 1924, the report was 62,509 tons (29,567 tons of railroad specialties and 32,942 tons of miscellaneous castings). Railroad specialties in September were less than one-third the total for last December.

Bookings of castings for the nine months ended with September totaled 515,664 tons, against 535,759 tons for the corresponding period of last year. In the nine months of 1925, railroad specialties consisted of 199,741 tons, against 262,552 tons for the corresponding period of 1924. Miscellaneous castings this year, at 315,923 tons, showed a good increase over the 273,207 tons for the first nine months of 1924.

Changes Among Westinghouse Officials

Edward D. Kilburn, vice-president and general manager Westinghouse Electric International Co., and Walter S. Rugg, general sales manager Westinghouse Electric & Mfg. Co., have been named vice-presidents of the latter company, and Richard B. Mellon, Pittsburgh, president Mellon National Bank of that city, and a brother of A. W. Mellon, Secretary of the Treasury, has been elected a director of the company to fill the vacancy caused by the death of William McConway, formerly president of the McConway & Torley Co., Pittsburgh.

Mr. Rugg will take charge of the engineering, and Mr. Kilburn of the sales activities of the company. H. D. Shute, vice-president, remains in the sales department and will direct the broad commercial activities of the company, including especially customer relationships.

H. P. Davis, vice-president, formerly in charge of engineering and manufacturing activities as applying strictly to the company's electrical business, will have direction over the entire manufacturing activities of the company and, in addition, will have direction on the general features of the radio business, including broadcasting.

More than 200 employees of the Hockensmith Wheel & Mine Car Co., Penn, Pa., who went on strike recently against a second reduction in their wages within three months, have accepted the cut and gone back to work.

OBITUARY

ABRAHAM SAMUEL, aged 55, vice-president M. Samuel & Sons, Inc., Brooklyn, N. Y., died Oct. 11 at his home in that city. He had managed the New York office of the company for many years.

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EUGENE J. WEBER, general manager California Tractor Co., Stockton, Cal., died at his home in that city Oct. 13, aged 36. He was born in Boyd, Wis., but lived most of his life in Racine, Wis., rising to an executive position in the J. I. Case Threshing Machine Co. He assumed the management of the California concern about two years ago.

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MARTIN H. KENNEY, foundry superintendent North & Judd Mfg. Co., New Britain, Conn., died at the New Britain General Hospital, Oct. 12, following a short illness. He was taken ill upon his return from the foundrymen's convention. Mr. Kenney was a native of Sharon, Conn., had been associated with the North & Judd Mfg. Co. about 35 years and was one of the best known foundrymen in Connecticut.

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KARL E. MILLER, superintendent Donora Zinc Works, American Steel & Wire Co., Donora, Pa., died at the West Penn Hospital, Pittsburgh, Oct. 17, following an operation. He had been identified with the American Steel & Wire Co. since 1906, following his graduation from the Case School of Applied Science. His connection with the Donora plant began in 1909, first as an engineer and finally chief engineer of the steel works, later becoming assistant superintendent and about a year ago superintendent of the zinc works. He was born in North Benton, Ohio, March 16, 1883, and received his preliminary education at North Benton and Alliance, Ohio, and later attended Mt. Union College before entering Case School of Applied Science.

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THOMAS FRANKLIN MANVILLE, chairman board of directors, Johns-Manville, Inc., New York, died at the Hotel Plaza in that city Oct. 19 after a heart attack. He was 63 years of age, and had for years been one of the foremost figures in the asbestos and allied industries. After holding the office of president Johns-Manville, Inc., for many years, he resigned in March, 1924, to become chairman of the board of directors. He was president of the Arizona Asbestos Association, president and director Canada Asbestos and Danville Railroad, president and director Canadian Johns-Manville Co., Ltd., director, Dominion Hair Felt Co., Montreal, president Manville Securities Corporation, New York, director of the Fifth Avenue Bank and treasurer of the Franklin Savings Bank of that city.

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FRANK ROCKHILL HUTCHINSON, sales manager Independent Register Co., Cleveland, died Oct. 13 at his home in that city after a sudden attack of heart trouble. He was 48 years of age.

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WILLIAM LIVINGSTONE, president Lake Carriers' Association, died in Detroit, where he resided, Oct. 17, aged 81 years. During the many years that he was at the head of the organization, he took a leading part in projects to improve and make safer the waterways of the Great Lakes.

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OLIVER TRANSUE, president Transue & Williams Steel Forging Corporation, Alliance, Ohio, died in a Cleveland hospital Oct. 19, after a three weeks' illness. He was a director of the Republic Stamping & Enameling Co., Canton, Ohio, and the Buckeye Twist Drill Co., Alliance, and was prominently identified with several banking interests.

RAILROAD EQUIPMENT

New York Central Buys 125 Locomotives—Car Orders Total Nearly 2000

The New York Central Railroad has ordered 125 large locomotives, the Atlantic Coast Line has ordered 750 steel gondolas and the Montour Railroad 500 steel hopper cars. These are the outstanding railroad equipment orders of the week. Total number of cars purchased was 1787 and the total number of locomotives was 153.

Freight cars in need of repair on Oct. 1 totaled 179,571 or 7.7 per cent of the number on line, according to the Car Service Division, American Railway Association, while locomotives in need of repair as of the same date totaled 10,643 or 16.7 per cent of the number on line. This was a decrease in both instances as compared with the report of Sept. 15.

The principal equipment orders and inquiries of the week follow:

The New York Central has ordered 100 Mohawk type locomotives, each weighing 184 tons, from the American Locomotive Co. This is the largest order for locomotive equipment in many months. The 100 engines if closely coupled together would make a train of 1.8 miles. The same road has also placed 25 A-1 type 2-8-4 locomotives with the Lima Locomotive Works, Inc.

The Chesapeake & Ohio has placed an order with the American Locomotive Co. for an additional lot of 5 Pacific type locomotives, instead of 20 as reported recently. This makes a total of 55 engines placed with the American Locomotive Co. by this road. The C. & O. has also placed an order for 10 heavy locomotives with the Lima Locomotive Works, Inc., for its subsidiary, the Hocking Valley.

The Chilean State Railways have ordered 12 Mikado type locomotives from the American Locomotive Co.

The Tennessee Central has ordered 4 mountain type locomotives from the American Locomotive Co.

The Cerro de Pasco Copper Corporation has bought 2 consolidation type locomotives for use in Peru from the American Locomotive Co.

The Atlantic Coast Line has placed an order for 750 steel gondolas with the American Car & Foundry Co.

The Missouri Pacific has inquired for 500 steel underframes for stock cars in addition to the 2200 cars inquired for, as reported in THE IRON AGE last week.

The Central of Georgia is inquiring for 20 steel underframes for caboose cars.

The Central Railroad of New Jersey has ordered 10 air dump cars from the Magor Car Corporation.

The Valvoline Oil Co. has bought 10 tank cars from the Standard Tank Car Co.

The Indian Refining Co. has ordered 10 tank cars from the Standard Tank Car Co.

The Litchfield & Madison Railroad has ordered 50 gondola car bodies from the Ryan Car Co.

The New York Central has entered into a contract with the Illinois Car & Mfg. Co. for conversion of 200 box cars to flat cars.

The Havana Central has ordered 250 box cars with steel underframes and 145 flat cars from the American Car & Foundry Co.

The American Car & Foundry Co. has received orders for 100 mine cars from Allen & Garcia and the same number has been ordered by Peale, Peacock & Kerr.

W. W. Lindsay & Co. have ordered 12 charging cars from the American Car & Foundry Co.

The Montour Railroad has ordered 500 55-ton steel hopper coal cars from the Standard Steel Car Co.

Youngstown Company's Third Quarter Earnings

YOUNGSTOWN, Oct. 20.—The third quarter earnings statement of the Youngstown Sheet & Tube Co. shows net profits for the period equal to $3.08 per share of outstanding common stock. This compares with $3.22 net for the second quarter and $3.48 for the first. From third quarter earnings the company carried $2,062,610.81 to surplus after dividends, charges and allowance of $365,000 for Federal taxes.

Gross sales in July, August and September were $33,127,245.49. The statement includes a charge of $2,217,362.50 for mineral depletion and depreciation of plants and equipment; also an item of $1,060,613.90, representing interest and discount on funded debt.

NON-FERROUS METALS

The Week's Prices

Cents per Pound for Early Delivery

	Copper, New York		Straits Tin (Spot)	Lead		Zinc	
Oct.	Lake	Electrolytic*	New York	New York	St. Louis	New York	St. Louis
14.....	14.75	14.25	62.57½	9.60	9.25	8.62½	8.27½
15.....	14.75	14.25	62.75	9.60	9.25	8.62½	8.27½
16.....	14.75	14.25	62.12½	9.60	9.25	8.62½	8.27½
17.....	14.62½	14.37½	....	9.60	9.25	8.62½	8.27½
19.....	14.62½	14.37½	62.37½	9.60	9.25	8.70	8.30
20.....	14.62½	14.37½	62.50	9.60	9.25	8.70	8.30

*Refinery quotation; delivered price ¼c. higher.

New York

NEW YORK, Oct. 20.

Only moderate activity is reported, with prices steady to strong. The copper market is quiet but prices are a little firmer. Tin continues to advance with moderate buying. The lead market is unchanged. Strength in zinc is maintained and prices are higher.

Copper.—The week in electrolytic copper has been a colorless one. Most producers have been holding quite firmly to 14.62½c., delivered, for the rest of this year, but there have been some other sellers who have shaded this down to as low as 14.50c. In the early part of the week covered by this report some business was done at the 14.50c. level, but in the last few days most of the transactions have been at 14.62½c. or a few points under this. A limited amount was available today at 14.57½c., with the general market quoted at 14.62½c., delivered. Consumers are watching the situation closely and are slow to place orders. It is estimated, however, that at least 5,000,000 lb. will be bought within the next few days. Lake copper is quoted at 14.62½c., delivered. The publication of September statistics shows a loss in stocks of refined metal, but a gain in stocks of blister copper. They therefore had little effect on the market.

Tin.—For the calendar week ended Saturday, Oct. 17, about 900 tons of Straits tin was sold. This was considered a fair business because of the holiday early in the week. Consumers have been doing some of the buying and it is reported that a few of them are anxious purchasers. There is a difference of opinion as to whether consumers are covered for the rest of the year. It is pointed out, however, that when they buy they generally want October-November delivery. While the general market is spotty and not steady, a fair tonnage is being placed each week, with consumers taking about half of it. Little interest is shown yet in December delivery, but it is believed that consumers will have to buy for this position soon. Spot Straits tin today was quoted at 62.50c., New York, in a dull market. In London today quotations were about £3 per ton higher than a week ago and about £11 per ton higher than two weeks ago, with spot standard quoted at £280 5s., future standard at £280 10s. and spot Straits at £288 12s. The spread of £8 7s. 6d. between spot standard and spot Straits is pointed to as unusual. The Singapore price today was £289 2s. 6d. Arrivals thus far this month have been 4305 tons, with 4760 tons reported afloat.

Lead.—This market continues firm, with good inquiry and fair sales reported almost daily. There has been no change in quotations, the leading interest still maintaining its contract price at 9.50c., New York. In the outside market business is being done at 9.25c., St. Louis, or 9.60c., New York.

Zinc.—The feature of the week has been the effect of the publication last week of statistics for September, which showed a decrease of over 5000 tons in stocks of refined metal. This, together with persistent demand from abroad, has added new strength to the market and prices have continued to advance moderately until prime Western is quoted today at 8.35c., St. Louis, for spot or October, and 8.30c., St. Louis, or 8.65c., New York, for November delivery.

Nickel.—Wholesale lots of ingot nickel are quoted at 34c., with shot nickel at 35c. Electrolytic nickel is available at 38c. per lb.

Antimony.—The scarcity of Chinese metal is intensified and wholesale lots for spot delivery are quoted today at 18c., New York, duty paid. Metal for arrival in October-November is quoted at 17.50c.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted unchanged at 27c. to 28c. per lb.

Old Metals.—The market is moving back and forth in sympathy with ingot copper. Business is in fair volume. Dealers' selling prices are as follows in cents per lb.:

Copper, heavy and crucible	14.25
Copper, heavy and wire	13.25
Copper, light and bottoms	11.50
Heavy machine composition	10.25
Brass, heavy	8.75
Brass, light	7.75
No. 1 red brass or composition turnings	9.75
No. 1 yellow rod brass turnings	9.50
Lead, heavy	8.50
Lead, tea	7.00
Zinc	5.75
Cast aluminum	20.50
Sheet aluminum	20.50

Chicago

OCT. 20.—Tin has advanced following a speculative market in Europe. Zinc has also advanced because of insistent demand. Lead has increased in price while copper and antimony remain unchanged. The only change in the old metal market is that of tin which has advanced in keeping with the new metal market. We quote, in carload lots: Lake copper, 14.65c.; tin, 63.50c.; lead, 9.50c.; zinc, 8.40c; in less than carload lots, antimony, 18.50c. On old metals we quote copper wire, crucible shapes and copper clips, 11.50c.; copper bottoms, 10c.; red brass, 9c.; yellow brass, 7.75c.; lead pipe, 8c.; zinc, 5c.; pewter, No. 1, 35c.; tin foil, 44c.; block tin, 52c.; all being dealers' buying prices for less than carload lots.

Shipments in September of Independent Sheet Makers Well Above August

PITTSBURGH, Oct. 20.—September sales of sheets by producers reporting to the National Association of Sheet and Tin Plate Manufacturers did not quite reach the estimate based on early returns, but at 286,000 tons they were over 46,000 tons greater than in August, a gain of more than 19 per cent. Unfilled obligations were increased in September by 37,000 tons in the final figures, which is somewhat less than was indicated by early returns. September shipments scored a gain of approximately 19,000 tons over those for August. The report in detail makes the following comparison:

	1925			1924
	Sept.	Aug.	July	Sept.
Number of mills	708	699	699	686
Capacity per month, tons	426,300	409,000	433,600	413,000
Per cent reporting	74.9	75.6	75.3	70.0
Sales, tons	286,029	239,492	252,871	227,520
Production, tons	295,810	270,212	246,404	217,981
Shipments, tons	262,050	243,204	223,454	190,210
Unfilled orders, tons	497,698	460,530	475,950	274,325
Unshipped stocks, tons	81,562	76,101	88,859	81,576
Unsold stocks, tons	36,276	38,476	42,081	43,001
Percentages of Capacity				
Sales	90.7	77.2	80.1	78.7
Production	93.8	87.2	75.5	75.4
Shipments	83.1	78.5	70.8	65.8
Unfilled orders	157.8	153.9	150.8	94.9
Unshipped stocks	25.9	24.6	27.2	28.2
Unsold stocks	11.5	12.4	12.9	14.9

Canton Bridge and Massillon Steel Joist Companies Under Same Control

The controlling interests of the Massillon Steel Joist Co., Massillon, Ohio, have taken over the management of the Canton Bridge Co., Canton, Ohio. The Canton Bridge Co. will continue in its operation of a structural steel fabricating shop, in addition to producing the products of the Massillon Steel Joist Co. The home office of the Massillon company has been moved to the plant of the Canton company and the officers and department heads will function for both organizations.

Prices of Finished Iron and Steel Products (Carload Lots)

Tank Plates

F.o.b. Pittsburgh mill, base, per lb.....1.80c. to 1.90c.
F.o.b. Chicago, base, per lb.....2.10c.

Structural Shapes

F.o.b. Pittsburgh mill, base, per lb.....1.90c. to 2c.
F.o.b. Chicago, base, per lb.....2.10c.

Iron and Steel Bars

Soft steel bars, f.o.b. P'gh mills, base, per lb.....2c.
Soft steel bars, f.o.b. Chicago, base, per lb.....2.10c.
Reinforcing steel bars, f.o.b. P'gh mills, per lb.....2c.
Rail steel bars, f.o.b. Chicago and f.o.b. Chicago district mills, base, per lb.....2.00c.
Common iron bars, f.o.b. Chicago, base, per lb..1.90c. to 2.00c.
Refined iron bars, f.o.b. P'gh mills, base, per lb.....3.00c.
Common iron bars, eastern Pa. mill, base, per lb.....2.10c.

Hot-Rolled Flats

All gages, narrower than 6 in., base per lb., Pittsburgh .....2.40c. to 2.50c.
All gages, 6 in. and wider, base per lb., P'gh...2.20c. to 2.30c.
All gages, 6 in. and narrower, Chicago.....2.50c.
All gages, wider than 6 in., Chicago.....2.60c.
Cotton ties, per 45 lb. bundle, f.o.b. Atlantic ports.....$1.28
Cotton ties, per 45 lb. bundle, f.o.b. Gulf ports..... 1.25

Cold-Finished Steel

Screw stock and shafting, f.o.b. P'gh mills, base, per lb..2.40c.
Screw stock and shafting, f.o.b. Chicago, base, per lb...2.40c.
Screw stock, base, per lb., Cleveland.....2.45c. to 2.55c.
Shafting, ground, f.o.b. mill, base, per lb.....*2.80c. to 3.00c.
Strips, f.o.b. P'gh mills, base, per lb.....3.75c.
Strips, f.o.b. Cleveland mills, base, per lb.....3.75c.
Strips, delivered Chicago, base, per lb.....4.05c.
Strips, f.o.b. Worcester mills, base, per lb.....3.90c.

*According to size.

Wire Products

(To jobbers in car lots f.o.b. Pittsburgh and Cleveland)

Nails, base, per keg.....$2.65
Galvanized nails, 1-in. and longer, base plus..... 2.00
Galvanized nails, shorter than 1 in., base plus..... 2.25
Bright plain wire, base, No. 9 gage, per 100 lb..... 2.50
Annealed fence wire, base, per 100 lb..... 2.65
Spring wire, base, per 100 lb..... 3.50
Galvanized wire, No. 9, base, per 100 lb..... 3.10
Galvanized barbed, base, per 100 lb..... 3.35
Galvanized staples, base, per keg..... 3.35
Painted barbed wire, base, per 100 lb..... 3.10
Polished staples, base, per keg..... 3.10
Cement coated nails, base, per count keg..... 1.85
*Bale ties, carloads, to jobbers....75, 15 and 5 per cent off list
*Bale ties, carloads, to retailers...75, 10 and 6 per cent off list
Woven wire fence, base, per net ton to retailers.....$65

Chicago district mill and delivered Chicago prices are $1 per ton above the foregoing. Birmingham mill prices $3 a ton higher; Worcester, Mass., mill $3 a ton higher on production of that plant, and Duluth, Minn., mills $2 a ton higher; Anderson, Ind., $1 higher.

*F.o.b. Cleveland.

Sheets

Blue Annealed

(base) per lb.

Nos. 9 and 10, f.o.b. Pittsburgh.....2.25c. to 2.40c.
Nos. 9 and 10 (base) per lb., f.o.b. Chicago dist. mills, 2.40c. to 2.45c.

Box Annealed, One Pass Cold Rolled

No. 28 (base) per lb., f.o.b. Pittsburgh.....3.10c. to 3.25c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill..3.25c. to 3.35c.

Galvanized

No. 28 (base) per lb., f.o.b. Pittsburgh.....4.20c. to 4.40c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill..4.35c. to 4.40c.

Tin-Mill Black Plate

No. 28 (base) per lb., f.o.b. Pittsburgh.....3.10c. to 3.15c.
No. 28 (base) per lb., f.o.b. Chicago dist. mill.....3.25c.

Automobile Body Sheets

No. 22 (base) per lb., f.o.b. Pittsburgh.....4.25c. to 4.40c.

Long Ternes

No. 28 (base) 8-lb. coating, per lb., f.o.b. mill..4.60c. to 4.75c.

Tin Plate

Standard cokes, per base box, f.o.b. Pittsburgh district mills $5.50
Standard cokes, per base box f.o.b. Chicago district mills 5.60
Standard cokes, per base box f.o.b. Elwood, Ind..... 5.60

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per package, 20 x 28 in.)

8-lb. coating, 100 lb. base	$11.20	20-lb. coating I. C.	$15.50
8-lb. coating I. C.	11.50	25-lb. coating, I. C.	17.00
15-lb. coating I. C.	14.35	30-lb. coating I. C.	18.35
		40-lb. coating I. C.	20.35

Rivets

Large, f.o.b. P'gh and Cleveland mills, base, per 100 lb., $2.40 to $2.50
Large, f.o.b. Chicago, base, per 100 lb..... 2.60 to 2.65
Small, f.o.b. Pittsburgh .....70, 10 and 5 per cent off list
Small, Cleveland .....70, 10 and 10 per cent off list
Small, Chicago .....70, 10 and 10 per cent off list

Rails and Track Equipment

(F.o.b.)

Rails, standard, per gross ton.....$43.00
Rails, light, billet, base, per lb.....1.65c. to 1.70c.
Rails, light rail steel, base, per lb.....1.50c. to 1.60c.
Spikes, ⅜ in. and larger, base, per 100 lb.....$2.80 to $3.00
Spikes, ½ in. and smaller, base, per 100 lb.... 3.00 to 3.25
Spikes, boat and barge, base, per 100 lb..... 3.25
Track bolts, all sizes, base, per 100 lb..... 3.90 to 4.25
Tie plates, per 100 lb..... 2.35 to 2.40
Angle bars, base, per 100 lb..... 2.75

Welded Pipe

(F.o.b. Pittsburgh district mills)

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	45	19½	¼ to ⅜	+11	+39
¼ to ⅜	51	25½	½	22	2
½	56	42½	¾	28	11
¾	60	48½	1 to 1½	30	13
1 to 3	62	50½			

Lap Weld

2	55	43½	2	23	7
2½ to 6	59	47½	2½	26	11
7 and 8	56	43½	3 to 6	28	13
9 and 10	54	41½	7 to 12	26	11
11 and 12	53	40½			

Butt Weld, extra strong, plain ends

⅛	41	24½	2 to 3	61	50½
¼ to ⅜	47	30½	¼ to ⅜	+11	+54
½	53	42½	½	21	7
¾	58	47½	¾	28	12
1 to 1½	60	49½	1 to 1½	30	14

Lap Weld, extra strong, plain ends

2	53	42½	2	23	9
2½ to 4	57	46½	2½ to 4	29	15
4½ to 6	56	45½	4½ to 6	28	14
7 to 8	52	39½	7 to 8	21	7
9 and 10	45	32½	9 to 12	16	2
11 and 12	44	31½			

To the large jobbing trade the above discounts on steel pipe are increased (on black) by one point, with supplementary discount of 5 per cent and (on galvanized) by 1½ point, with supplementary discount of 5 per cent. On iron pipe, both black and galvanized, the preferentials to large jobbers are 1, 5 and 2½ per cent beyond the above discount.

NOTE—The above discounts on steel pipe also apply at Lorain, Ohio. Chicago district mills have a base 2 points less. Chicago delivered base 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point having the lowest rate to destination.

Boiler Tubes

(F.o.b. Pittsburgh)

Lap Welded Steel		Charcoal Iron	
2 to 2¼ in.	27	1½ in.	+18
2½ to 2¾	37	1¾ to 1⅞ in.	+ 8
3 in.	40	2 to 2¼ in.	— 2
3¼ to 3¾ in.	42½	2½ to 3 in.	— 7
4 to 13 in.	46	3¼ to 4½ in.	— 9

Beyond the above discounts, 5 to 7 fives extra are given on lap welded steel tubes and 2 tens on charcoal iron tubes.

Standard Commercial Seamless Boiler Tubes
Cold Drawn

1 in.	60	3 in.	45
1¼ to 1½ in.	52	3¼ to 3½ in.	47
1¾ in.	36	4 in.	50
2 to 2¼ in.	31	4½, 5 and 6 in.	45
2½ to 2¾ in.	39		

Hot Rolled

2 and 2¼ in.	34	3¼ and 3½ in.	50
2½ and 2¾ in.	42	4 in.	53
3 in.	48	4½, 5 and 6 in.	48

Less carloads, 4 points less. Add $8 per net ton for more than four gages heavier than standard. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gage to be held at mechanical tube list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing (New List)

Carbon 0.10 to 0.30 base.....50 to 55 per cent off list
Carbon 0.30 to 0.40 base.....45 to 50 per cent off list

Plus differentials for lengths over 18 ft. and for commercially exact lengths. Warehouse discounts on small lots are less than the above.

Prices of Iron and Steel Products and Raw Materials

Ores

Lake Superior Ores, Delivered Lower Lake Ports

Old range Bessemer, 51.50 per cent iron	$4.55
Old range non-Bessemer, 51½ per cent iron	4.40
Mesaba Bessemer, 51.50 per cent iron	4.40
Mesaba non-Bessemer, 51.50 per cent iron	4.25
High phosphorus iron, 51.50 per cent	4.15

Foreign Ore, per Unit, c.i.f. Philadelphia or Baltimore

Iron ore, low phos., copper free, 55 to 58 per cent iron in dry Spanish or Algerian	9.50c. to 10c.
Iron ore, Swedish, average 66 per cent iron	9.50c.
Manganese ore, washed, 51 per cent manganese, from the Caucasus	45c.
Manganese ore, Brazilian or Indian, nominal	42c.
Tungsten ore, high grade, per unit, in 60 per cent concentrates	$12.00 to $13.00
Chrome ore, Indian basic, 48 per cent Cr_2O_3, crude, per ton, c.i.f. Atlantic seaboard	20.50 to 24.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	65c. to 70c.

Coke and Coal

(Per Net Ton)

Furnace coke, f.o.b. Connellsville prompt	$7.50 to $8.00
Foundry coke, f.o.b. Connellsville prompt	7.50 to 8.00
Mine run steam coal, f.o.b. W. Pa. mines	1.50 to 2.10
Mine run coking coal, f.o.b. W. Pa. mines	2.00 to 2.25
Mine run gas coal, f.o.b. W. Pa. mines	2.00 to 2.25
Steam slack, f.o.b. W. Pa. mines	1.25 to 1.35
Gas slack, f.o.b. W. Pa. mines	1.40 to 1.50

Ferroalloys

Ferromanganese, domestic, 80 per cent, furnace, or seaboard, per ton	$115.00
Ferromanganese, foreign, 80 per cent, f.o.b. Atlantic port, duty paid	115.00
Ferrosilicon, 50 per cent, delivered	$82.50 to 85.00
Ferrosilicon, 75 per cent	145.00 to 147.50
Ferrotungsten, per lb. contained metal	1.15 to 1.20
Ferrochromium, 4 per cent carbon and up, 60 to 70 per cent Cr., per lb. contained Cr. delivered	11.50c.
Ferrovanadium, per lb. contained vanadium	$3.50 to $4.00
Ferrocarbontitanium, 15 to 18 per cent, per net ton	200.00

Spiegeleisen, Bessemer Ferrosilicon and Silvery Iron

(Per gross ton furnace unless otherwise stated)

Spiegeleisen, domestic, 19 to 21 per cent.....$31.00 to $33.00
Spiegeleisen, domestic, 16 to 19 per cent..... 30.00 to 32.00
Ferrosilicon, Bessemer, 10 per cent, $34; 11 per cent, $36; 12 per cent, $38; electric furnace ferrosilicon, 10 per cent, $38 furnace; 11 per cent, $38; 12 per cent, $38; 14 to 16 per cent, $45.
Silvery iron, 6 per cent, $26.50; 7 per cent, $27.50; 8 per cent, $28.50; 9 per cent, $30; 10 per cent, $32; 11 per cent, $34; 12 per cent, $36.

Fluxes and Refractories

Fluorspar, 85 per cent and over calcium fluoride, not over 5 per cent silica, gravel, per net ton, f.o.b. Illinois and Kentucky mines	$16.00
No. 2 lump, per net ton	19.00
Fluorspar, foreign, 85 per cent calcium fluoride, not over 5 per cent silica, c.i.f. Philadelphia, duty paid, per net ton	16.00
Fluorspar, No. 1 ground bulk, 95 to 98 per cent calcium fluoride, not over 2½ per cent silica, per net ton, f.o.b. Illinois and Kentucky mines	32.50

Per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$43.00 to $46.00	$40.00 to $43.00
Maryland	48.00 to 50.00	43.00 to 45.00
Ohio	43.00 to 46.00	40.00 to 43.00
Kentucky	43.00 to 45.00	40.00 to 43.00
Illinois	43.00 to 45.00	40.00 to 43.00
Missouri	40.00 to 43.00	35.00 to 38.00
Ground fire clay, per ton		6.50 to 7.50

Silica Brick:	
Pennsylvania	40.00
Chicago	49.00
Birmingham	54.00
Silica clay, per ton	8.00 to 9.00
Magnesite Brick:	
Standard size, per net ton (f.o.b. Baltimore and Chester, Pa.)	65.00
Grain magnesite, per net ton (f.o.b. Baltimore and Chester, Pa.)	40.00
Chrome Brick:	
Standard size, per net ton	48.00

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham and Chicago)

Machine bolts, small rolled threads..60 and 10 per cent off list
Machine bolts, all sizes, cut threads, 50, 10 and 10 per cent off list
Carriage bolts, smaller and shorter, rolled threads, 50, 10 and 10 per cent off list
Carriage bolts, cut threads, all sizes..50 and 10 per cent off list
Eagle carriage bolts.....65 and 10 per cent off list
Lag bolts.....60, 10 and 10 per cent off list
Plow bolts, Nos. 3 and 7 heads.....50 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ x 4 in., 45, 10 and 5 per cent off list
Larger and longer sizes.....45, 10 and 5 per cent off list
Hot-pressed nuts, blank and tapped, square.....4c. off list
Hot-pressed nuts, blank or tapped, hexagons....4.40c. off list
C.p.c. and t. square or hex. nuts, blank or tapped..4.10c. off list
Bolt ends with hot pressed nuts..50, 10 and 10 per cent off list
Bolt ends with cold pressed nuts..45, 10 and 5 per cent off list
Washers*.....6.50c. to 6.25c. off list

*F.o.b. Chicago and Pittsburgh.

The discount on machine, carriage and lag bolts is 5 per cent less than above for less than car lots. On hot pressed and cold punched nuts the discount is 25c. less per 100 lb. than quoted above for less than car lots.

(Quoted with freight allowed within zone limits.)

Semi-finished hex. nuts:
½ in. and smaller, U. S. S.....80, 10 and 5 per cent off list
⅝ in. and larger, U. S. S.....75, 10 and 5 per cent off list
Small sizes, S. A. E.....80, 10, 10 and 5 per cent off list
S. A. E., ⅝ in. and larger....75, 10, 10 and 5 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10, 5 and 2½ per cent off list
Tire bolts.....60 and 5 per cent off list

Semi-Finished Castellated and Slotted Nuts

(Prices delivered within specified territories)
(To jobbers and consumers in large quantities)

	Per 100 Net S. A. E.	Per 100 Net U. S. S.		Per 100 Net S. A. E.	Per 100 Net U. S. S.
¼-in.	$0.44	$0.44	¾-in.	$2.35	$2.40
5/16-in.	.515	.515	⅞-in.	3.60	3.60
⅜-in.	.62	.66	1-in.	5.65	5.80
7/16-in.	.79	.90	1⅛-in.	8.90	8.90
½-in.	1.01	1.05	1¼-in.	12.60	13.10
9/16-in.	1.38	1.42	1⅜-in.	18.35	18.35
5/8-in.	1.70	1.73	1½-in.	21.00	21.00

Larger sizes—Prices on application.

Cap and Set Screws

(Freight allowed within zone limits)

Milled cap screws.....80, 10 and 5 per cent off list
Milled standard set screws, case hardened, 80 and 10 per cent off list
Milled headless set screws, cut thread, 80 and 10 to 80 per cent off list
Upset hex. head cap screws, U. S. S. Thread, 80, 10, 10 and 5 per cent off list
Upset hex. cap screws, S. A. E. Thread, 80, 10 and 5 per cent off list
Upset set screws.....80, 10 and 10 per cent off list
Milled studs.....75 per cent off list

Semi-Finished Steel, f.o.b. Pittsburgh or Youngstown, per gross ton

Rolling billets, 4-in. and over	$33.50 to $35.00
Forging billets, ordinary	40.00
Forging billets, guaranteed	45.00
Sheet bars	$33.50 to 35.00
Slabs	33.50 to 35.00
*Wire rods, common soft, base, No. 5 to ⅜-in.	45.00
Wire rods, common soft, coarser than ⅜-in.	$2.50 over base
Wire rods, screw stock	$5.00 per ton over base
Wire rods, carbon 0.20 to 0.40	3.00 per ton over base
Wire rods, carbon 0.41 to 0.55	5.00 per ton over base
Wire rods, carbon 0.56 to 0.75	7.50 per ton over base
Wire rods, carbon over 0.75	10.00 per ton over base
Wire rods, acid	15.00 per ton over base
Skelp, grooved, per lb.	1.90c.
Skelp, sheared, per lb.	1.90c.
Skelp, universal, per lb.	1.90c.

*Chicago mill base is $46. Cleveland mill base, $45.

Alloy Steel

(F.o.b. Pittsburgh or mill)

S. A. E. Series Numbers		Bars 100 lb.
2100*	(½% Nickel, 10 to 20 per cent Carbon)	$3.30
2300	(3½% Nickel)	$4.60 to 4.65
2500	(5% Nickel)	5.80
3100	(Nickel Chromium)	3.60
3200	(Nickel Chromium)	5.20 to 5.30
3300	(Nickel Chromium)	7.30
3400	(Nickel Chromium)	6.60
5100	(Chromium Steel)	3.60 to 3.70
5200*	(Chromium Steel)	7.50 to 8.25
6100	(Chromium Vanadium bars)	4.40
6100	(Chromium Vanadium spring steel)	3.85
9250	(Silicon Manganese spring steel)	3.30
	Carbon Vanadium (0.45 to 0.55 Carbon, 0.15 Vanadium)	4.20 to 4.45
	Nickel Chrome Vanadium (0.60 Nickel, 0.50 Chromium, 0.15 Vanadium)	4.50
	Chromium Molybdenum bars (0.80—1.10 Chromium, 0.25—0.40 Molybdenum)	4.45
	Chromium Molybdenum bars (0.50—0.70 Chromium, 0.15—0.25 Molybdenum)	3.60
	Chromium Molybdenum spring steel (1—1.25 Chromium, 0.30—0.50 Molybdenum)	4.75 to 5.00

Above prices are for hot-rolled steel bars, forging quality. The ordinary differential for coal drawn bars is 1c. per lb. higher. For billets 4 x 4 to 10 x 10-in. the price for a gross ton is the net price for bars of the same analysis. For billets under 4 x 4-in. down to and including 2½-in. squares, the price is $5 a gross ton above the 4 x 4 billet price.

*Not S. A. E. specifications, but numbered by manufacturers to conform to S. A. E. system.

PERSONAL

E. G. Howell, formerly assistant manager of the raw material department in the Chicago office of Hickman, Williams & Co., 332 South Michigan Boulevard, has been appointed manager of the department to succeed the late E. F. Axner. Starting in 1905 as office boy in the executive department of the Republic Iron & Steel Co., he became chief clerk of the Chicago district branch. In 1911 he joined the sales forces of the Chicago office. During 1914 he worked in the metallurgical department of the Illinois Steel Co., South Chicago, returning in 1915 to the sales department of the Republic Iron & Steel Co., and remaining with that company until 1917. During the war he was a captain of infantry, stationed at Camp Grant, Rockford, Ill. From 1919 to 1922 he was assistant treasurer Briggs & Turivas, Chicago, dealers in iron and steel. Late in 1922 he accepted a position in the raw material department of the Chicago office of Hickman, Williams & Co., and in 1924 was promoted to assistant manager of that department.

E. G. HOWELL

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H. B. Green, formerly sales agent in San Francisco for the Bethlehem Steel Co., is now representing the Graham Bolt & Nut Co. and the Interstate Iron & Steel Co. on the Pacific Coast, with offices at 474 Monadnock Building, San Francisco. Mr. Green for 24 years was connected with the Pennsylvania Steel Co. and the Bethlehem Steel Co., which took over the holdings of the former concern.

—

Dean K. Chadbourne has been appointed general manager Westinghouse Electric International Co. to succeed E. D. Kilburn, who was recently elected vice-president Westinghouse Electric & Mfg. Co., East Pittsburgh. Mr. Chadbourne was born in Elmira, N. Y., and graduated from Purdue University in 1906 with the degree of Bachelor of Science in Electrical Engineering. He was with Allis-Chalmers Mfg. Co. in its Chicago office and was Chicago district manager George Cutter Co., South Bend, Ind., before he joined the Westinghouse Electric International Co. in 1920.

—

W. C. Sayle has been appointed secretary and treasurer and M. G. Thomas as manager of the City Foundry Co., Cleveland, to fill vacancies caused by the recent death of W. F. Swift.

—

E. F. Church, president and general manager of Wellman-Seaver-Morgan Co., Cleveland, is on an extended business trip to Europe and among other countries will visit Russia. He is expected home about Nov. 1.

—

A. W. F. Green, metallurgist John Illingworth Steel Co., Philadelphia, gave an illustrated talk on the manufacture of carbon crucible steel before the Hartford chapter American Society for Steel Treating at the October meeting.

—

William S. Bidle, president American Society for Steel Treating, and W. H. Eisenman, Cleveland, secretary, were the guests of the Worcester chapter on Thursday evening, Oct. 15. Mr. Bidle's address was "A Practical Talk on Equipment of Heat Treating Plants."

—

Richard Collings, for many years with the Cleveland Faucet Co., and later with the American Pin Co., Waterbury, Conn., has joined the sales force of the Bridgeport Brass Co., Bridgeport, Conn., and will cover Michigan, Ohio, Pittsburgh and Buffalo territories.

—

A. F. Blasdell, manufacturing superintendent Pittsfield, Mass., works General Electric Co., has been granted a leave of absence on account of sickness. R. E. Wagner, assistant superintendent, will have charge of manufacturing during Mr. Blasdell's absence.

—

John Gilbert, secretary Maderia Hill Coal Mining Co., Mount Carmel district, Pa., has been elected a director of the Ames Shovel & Tool Co., Boston.

—

Walter Mathesius has been appointed assistant general superintendent at the South Chicago works of the Illinois Steel Co. He succeeds J. I. Larimer, resigned. Other changes are as follows: Harry Strain has been made superintendent of blast furnaces; M. J. Devaney has been appointed superintendent of steel mills and H. Henderson is now superintendent of rolling mills.

—

J. J. Horran has been appointed purchasing agent Pratt & Whitney Co., Hartford, Conn., to succeed O. P. Palmer, resigned. J. C. Ward has been made assistant general manager, David Ayr, factory manager, and W. H. Weingar, manager of the gage division.

—

Frederick J. Greene, president and treasurer F. J. Greene Engineering Works and president Christianson Machine Co., Racine, Wis., has been elected a director of the First National Bank of Racine to fill the vacancy caused by the death of John Reid, Jr., who was president of the Belle City Mfg. Co.

—

Fred G. Syburg, assistant to the export manager, Chain Belt Co., Milwaukee, will sail Oct. 21 from San Francisco on a year's business tour of China, Japan and India.

—

Albert Korsan, Globe Steel Tubes Co., Milwaukee, was elected president of the Wisconsin chapter of the National Association of Purchasing Agents, at the annual meeting held Oct. 13 at Kenosha, Wis. C. A. Kelly, Bucyrus Co., South Milwaukee, was elected vice-president.

—

Charles A. Simmons, president Simmons Machine Tool Corporation, Albany, N. Y., sailed Oct. 17 on a seven weeks' business trip through England, France and Germany.

—

Samuel T. Harleman, formerly with the Bethlehem Steel Co., Bethlehem, Pa., and the Atlas Crucible Steel Co., Dunkirk, N. Y., and recently with Henry Disston & Sons, Inc., Philadelphia, has joined the sales forces of the Universal Steel Co., Bridgeville, Pa.

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E. Von Maltitz, formerly metallurgical engineer of the Illinois Steel Co., South Chicago, has associated himself with H. A. Brassert & Co., Chicago, consulting engineers, to take charge of their work in the field of special steels.

—

John W. England has been appointed superintendent of the North Birmingham blast furnaces of the Sloss-Sheffield Steel & Iron Co., Birmingham, and C. O. Barks has been transferred from North Birmingham to the city furnaces. Mr. England returned to Birmingham from the Napier Iron Works at Napier, Tenn.

Forecasting the Manufacturing Program

(*Concluded from page* 1102)

of the program and work backwards by making estimates of all expenses, except direct production materials, if we assume certain percentages of machine activity and ask our superintendents to base their estimates on such figures. For example: every such man knows how many operators he will require to run all of his equipment, or 100 per cent full. From this the number of other supervisors, inspectors, etc., can then be derived and so the whole set of figures works out as well as if the sales department had given an estimate which would require the whole capacity of the department to produce it.

This step taken, the next is to consult the superintendents as to how great a reduction in the machine activity would enable them to make a reduction in their supervisory forces. For this purpose, each department must be considered separately and it is quite possible that the larger departments will have to be subdivided if they have more than one class of product to handle.

It is easily seen that in a small department with two supervisors, a reduction of 50 per cent might be needed to make any change in supervision possible, whereas, in a large department with ten supervisors, only 10 per cent or less reduction of activity might save a supervisor. Another factor which needs careful consideration is that as the volume of work shrinks, the average effectiveness of the operators rises and less supervision is required proportionately to the number of men or machines working.

The converse is true with an increasing volume of business, especially where new operators have to be taken in and trained to the work. In such cases, the number of supervisors must be raised a month or two before production itself reaches the maximum.

Overhead "Steps" Up or Down

THE point I am trying to make is that the number of supervisors and consequent overhead cost of a department can not be expected to follow the ups and downs of the production curve with any consistency. It must, of necessity, move by steps and these steps will not be the same for an ascending production curve as for a descending production curve. Any competent superintendent, however, once he gets clearly in his mind what is wanted, can lay out these steps with astonishing accuracy and can give the percentages of machine activity or volume of production at which they will take place. Once such figures are obtained they can be charted. Then the actual performance both as to production and as to cost can be plotted against the chart and a comparison made which will either serve as a valuable incentive to the organization and a guide to the management or else point out defects in the method of calculation which can be remedied, or weak spots in the organization itself.

It is quite possible that some will think that such a plan involves a good deal of work which may result only in proving that a satisfactory condition exists as was believed by the management from the start. A very simple test which we used will show whether such is the case or not.

Every department in a factory has its irreducible minimum of overhead which will go on unless the department is shut down completely. I refer to supervision and the other fixed costs which do not vary with the volume of production. At the same time, an estimate based on past experience, is made of the total overhead charge of the department from which the hourly machine rate charges are figured for a normal percentage of activity.

If the irreducible minimum is subtracted from the total estimated overhead, the remainder will be that part of the overhead which can be expected to vary, though not directly, with the percentage of activity in the department.

The normal percentage of activity used for calculating the machine rates is made up of a certain number of machine hours and if this figure is divided into the variable portion of the burden we get a normal rate of variation per hour which will serve as a rough index figure, as follows: For any given period to be tested, subtract from the actual overhead figure incurred by the department in question, the irreducible minimum used before. This gives the actual number of machine hours worked by the department, which multiplied by the normal rate of variation per hour gives a standard variable overhead which can be compared directly with the actual variable overhead. If you are satisfied with the comparison you need go no further. Unless I am mistaken, if you get this far, you will go further. Lastly, such a method of forecasting the production program has a result which is more valuable under present conditions than it otherwise would be.

Taking Orders Below Cost

FEW of us today are blessed with all the business we want at satisfactory prices. Few of us are unfamiliar with the wisdom of selling below cost, to get a percentage of the overhead back. Few of us have not had to wrestle with the problem of how much we can cut a given price to get a given order and still be better off than if we did not get it.

Forecasting a production program is not a panacea for this situation. I don't know that there is or ever will be any. But since usually the sales department has a pretty definite idea of what price will land the order, if we have our figures made up as suggested, such an order can be translated into departmental activity and we can, by relating this activity to other known business factors determine whether the increase will involve more overhead expense than it will save and this before the order is taken rather than after as is usually the case. Since the plan gives a goal to shoot at, adjusted to meet the existing circumstances and set up by those responsible for the results, and since it gives the management another measuring stick, however inadequate and limited, the work of forecasting the production program, with or without a sales department estimate, appears to be well worth while and to substitute facts in one part of our calculations for the necessity of guessing—"A consummation devoutly to be wished."

Business Outlook Encouraging for Remainder of the Year

(*Concluded from page* 1129)

was slightly lower in September than in August, but scrap prices have recently gained a little. Usually the barometer of unfilled orders forecasts the scrap market and it seems likely to do so in the present instance—again repeating the history of August, 1924.

Building Sets Record

BUILDING activity reached the peak for all time in September (See Fig. 4). This statement is based upon the square feet of floor space in contracts awarded as reported by the F. W. Dodge Co., due adjustment being made to allow for seasonal changes. At the same time the average rate on commercial paper increased.

These facts are especially interesting because building activity has been a chief factor in the current prosperity and easy money has been hardly less important. The immediate point, however, is the general relationship which appears to exist between the money market and building activity. Roughly speaking, the peak of building follows the low points in the money market by about a year and a half. If we take this relationship shown by past data as a working hypothesis, we arrive at the conclusion that the peak of building activity will be reached in January or February next year, and in view of information as to the supply of buildings and the trend of rentals, this peak is likely to be followed by a major decline.

This does not necessarily mean a building debacle. The sharpness of the decline would depend in part on the amount of advance in money rates during the remainder of the year, and at present no sharp increase is in sight. Owing to the absence of commodity price inflation and to the moderate nature of business expansion, it seems more reasonable to anticipate that money rates will merely hold at present levels and show little more than the usual seasonal trend.

Machinery Markets and News of the Works

AXLE MAKER LARGE BUYER

Eaton Axle & Spring Co., Cleveland, Is Spending $500,000 for Equipment

General Machine Tool Business Is Good—Reports That Some Manufacturers May Advance Prices

ONE of the largest machine tool buying programs in years is under way at the plant of the Eaton Axle & Spring Co., Cleveland, an important maker of automobile axles and springs, where $500,000 is being expended on new shop equipment. The list of requirements totals about 340 machines, and many of these were bought in the last week. A large share of the new equipment will be standard production machinery.

Machine tool business in all markets is fairly active, though some sections of the country show more gains than others. There are few machine tool builders whose total sales thus far in October have not exceeded those for the same period in September. Demand has been best for the lighter and medium sized tools, but the sale of heavy tools will receive impetus if the contemplated purchase of about 80 tools by the Norfolk & Western Railroad is carried out. The Delaware & Hudson is one of several roads which are contemplating the issuance of lists of tools needed.

A shortage of skilled mechanics has developed. This is particularly acute in Cleveland and nearby territory, where the labor situation has been affected by the demands of the Michigan automobile industry.

There are reports that some builders of machine tools will soon announce an advance in prices approximating 10 per cent in most cases.

New York

NEW YORK, Oct. 20.

MACHINE tool business continues fairly satisfactory, showing an improvement in volume over September. Orders are coming from scattered sources and are usually for single machines, but the fact that operations are increasing in many manufacturing plants has brought about a condition wherein there is less hesitancy in buying. Railroad buying is light, but it is expected that some other roads will soon follow the example of the Norfolk & Western, which has just put out a big list, as reported in THE IRON AGE a week ago. The Delaware & Hudson is reported to be working on a list, which will probably be sent out soon.

Additions being made to the plant of the Albert Pipe & Supply Co., Brooklyn, N. Y., will provide a total floor area of 25,000 sq. ft. Two 40-ft. span electric traveling cranes are being installed for yard service. Pipe up to 24 in. can now be handled.

Plans have been filed by the Ice Service Co., 68 Ninth Avenue, New York, for a two-story plant, 83 x 175 ft., at 514-26 East 116th Street, to cost about $100,000 with machinery. A one-story plant, 47 x 75 ft., will be erected at 551-53 West 129th Street, to cost $60,000. Edward M. Adelsohn, 350 Stone Avenue, Brooklyn, is architect. Samuel Rubel is president.

The Brooklyn Edison Co., Pearl and Willoughby Streets, Brooklyn, has acquired two square blocks of property at Third and Fourth Avenue, First to Third Streets, and plans to use a portion of the site for an equipment storage and distributing works, with service department, to cost more than $200,000. Matthew S. Sloan is president.

The Board of Transportation, 49 Lafayette Street, New York, has asked bids for superstructure for the main repair and machine shop at the Coney Island yards of the municipal subway system, Avenue X and Shell Road, to cost $300,000.

The Uppercu Cadillac Corporation, 1881 Broadway, New York, has work in progress on a six-story service, repair and garage building at Atlantic Avenue and Adelphi Street, Brooklyn, to cost $500,000 with equipment. It will have facilities for 600 cars.

J. B. Ferguson, Inc., 41 East Forty-first Street, New York, manufacturer of radio equipment, has leased a recently completed building on Eleventh Avenue, Long Island City, for a new plant.

The Mohegan Tube Co., Scott Avenue, Brooklyn, manufacturer of steel and metal tubing, has taken out a building permit for a five-story addition to cost about $325,000 with equipment. A. Schwartz, 103 Park Avenue, New York, is architect.

The Thermiodyne Radio Corporation, 1819 Broadway, New York, has arranged for the establishment of a new assembling plant at Long Island City, to be developed as one of the main plants in this line, supplementing two such works now at Plattsburg, N. Y. With unfilled orders aggregating about 200,000 sets of equipment, the company has completed arrangements with the Jones Radio Corporation, 384 Monroe Street, Brooklyn, to devote a portion of its works to Thermiodyne set manufacture.

The Sherman Radio Mfg. Co., New York, has leased a floor in the building at 114-16 East Thirteenth Street for a new plant.

The United Paper Board Co., Whippany, N. J., will rebuild the portion of its local Hanover mill, destroyed by fire several weeks ago. It will cost about $40,000. Additional equipment will be installed.

Hammill & Gillespie, Inc., 240-42 Front Street, New York, producer of clays, feldspar, flint, etc., has begun the erection of its proposed mill for grinding, sorting, loading, etc., at Carteret, N. J., to be 60 x 200 ft. Contract for the building has been let to the Standard Erecting Co., 110 East Forty-second Street, New York.

The Atlas Welding Co., 1421 Adams Street, Hoboken, N. J., has taken out a permit to erect a one-story addition.

The National Asbestos Mfg. Co., 163 Henderson Street, Jersey City, N. J., has awarded a general contract to the Industrial Engineering Co., 30 Church Street, New York, for a five-story addition to cost about $100,000. John T. Rowland, Jr., Journal Building, Jersey City, is architect.

J. R. Monroe, president Monroe Calculating Machine Co., 555 Mitchell Street, Orange, N. J., is at the head of a new company organized to manufacture check protecting machines and parts. A factory at Mitchell and South Jefferson Streets has been acquired and will be equipped for a new plant. The new company, it is stated, will have no connection with the calculating machine organization. E. F. Britten, Jr., will be vice-president and general manager of the new concern.

The Zeh & Hahnemann Co., 190 Vanderpool Street, Newark, N. J., manufacturer of presses and other machinery, has awarded a general contract to William C. Phelps & Co., 21 Fulton Street, for a one-story addition to its machine shop, 18 x 100 ft., including improvements in the present shop, to cost $25,000. Fred A. Phelps, 21 Fulton Street, is architect.

Fire, Oct. 8, destroyed a portion of the works of the American Balsa Wood Corporation, 115 Frelinghuysen Avenue, Newark, N. J., manufacturer of heat-insulating products, on East Alpine Street, with loss reported at $100,000. The Foley Service Garage, on adjoining site, was also damaged. Plans for rebuilding both structures are under advisement.

The American Brown Boveri Electric Corporation, New York, now establishing itself at the shipyard of the New York Shipbuilding Corporation, Camden, N. J., recently acquired, has submitted, through its subsidiary, the Scintilla Magneto Co., Sidney, N. Y., a low bid for electric power

equipment for Los Angeles, Cal., totaling $346,000, with alternate figure of $384,000 for steam turbine electrical generating apparatus for unit No. 1 of a new steam-operated station to be located at Los Angeles harbor. Other bidders were the Allis Chalmers Mfg. Co., $411,570, with $50,000 additional for deferred payments at 7 per cent; Westinghouse Electric & Mfg. Co., $425,000, with $12,500 additional for deferred payments at 6 per cent, and the General Electric Co., $460,831, no additional amount for deferred payments, with interest at 6 per cent on balance. The Llewellyn Iron Works, Los Angeles, submitted the low quotation on steam boilers at $329,123, with $18,000 additional for deferred payments at 6 per cent.

New England

BOSTON, Oct. 19.

MANY local machine tool dealers did more business the past week than in any similar period in months. Inquiries which have been under consideration many weeks developed into orders, while fresh inquiries also resulted in some business. One of the most active houses reports trade so far this month at 70 per cent of normal, figuring on a pre-war basis. A large percentage of recent sales have been of single machines, two exceptions being the sale of a large planer, a shaper and a large radial drill to a western Massachusetts company, and two thread milling machines, one an over-size, to a Providence shop. One railroad bought a 2½-in. double-head bolt cutter, New Haven and Hartford plants bought shapers, three drilling machines went to a Worcester company, a large planer to a western Massachusetts manufacturer, a crank planer to a Cape Cod company which has also given a verbal order for two Cincinnati shapers, and a milling machine was placed in a city adjacent to Boston. The inactivity of lathes is noticeable.

The Baldwin Chain & Mfg. Co., Worcester, Mass., writes that an item appearing in this column on Oct. 8 was misleading in its intimation that a new plant was to be erected at Auburn, Mass. Instead, it refers to its new factory now occupied at the Auburn-Worcester line.

Kraft-Lamson, Inc., Edgewood, R. I., has been incorporated to manufacture a domestic oil burner, all foundry work for which will be done by contract. The necessary material has been purchased.

The Forestville Mfg. Co., Forestville, Conn., has been incorporated with a capital of $10,000 to manufacture screw-machine products. The company's manufacturing plant is completed, but it has not as yet purchased full equipment.

The two-story plant of the Arabian Mfg. Co., Bedford, Mass., fancy wrought iron goods, was destroyed by fire recently and much machinery lost. The company contemplates building and equipping a new plant within the next few months.

The plant of the E. Politi Granite Co., Northfield, Mass., was recently destroyed by fire. The company will rebuild and will require lifting equipment.

The Narragansett Electric Light Co., Eddy Street, Providence, R. I., will build a one-story, 19 x 66 ft. screen house. Jenks & Ballou, Providence, are the architects.

Plans will soon be ready for a one-story, 110 x 141 ft. machine shop for the H. B. Smith Co., Westfield, Mass., heating appliances. French & Hubbard, 210 South Street, Boston are the engineers.

Foundations are going in for a one-story, 30 x 100 ft. machine shop on California Street for the Newton Machine Screw Co., Crafts Street, Newton, Mass. Plans are private.

The Thompson Wire Co., 41 Mildred Avenue, Dorchester, Boston, has awarded contract for a one-story, 45 x 65 ft. addition. Brainard & Leeds, 89 Franklin Street, Boston, are the architects.

The Manufacturers Equipment & Engineering Co., Marble Street, Framingham, Mass., has awarded contract for the erection of an addition. Charles T. Main, 200 Devonshire Street, Boston, is the engineer.

The Hunt-Spiller Mfg. Corporation, 383 Dorchester Avenue, Boston, manufacturer of furnace castings, etc., has plans for a power house, 40 x 85 ft., to cost $45,000.

J. A. Boyer & Co., Webster Street, West Newton, Mass., are contemplating rebuilding the portion of their woodworking plant destroyed by fire Oct. 8, with loss of $22,000 including equipment.

The Skayef Ball Bearing Co., Hartford, Conn., will build a one-story addition to its plant at 330 New Park Avenue, to cost approximately $20,000.

The Connecticut Co., West Main Street, Waterbury, Conn., has revised plans for a proposed one-story car barn and shops, to cost $400,000, including equipment. Bids recently received have been rejected. R. W. Foote, 185 Church Street, New Haven, Conn., is architect.

The Fitzgerald Mfg. Co., North Main Street, Torrington, Conn., manufacturer of automobile horns, etc., has begun the erection of a one-story addition. The company recently made other enlargements and is arranging for increase in capacity. P. J. Fitzgerald is president.

The Mack Motor Haulage Corporation, 561 Washington Street, New York, plans the erection of a service, repair and garage building at Bridgeport, Conn., to cost $150,000 with equipment.

The John Swaine Associated Iron Works, Inc., 26 Cypress Court, Springfield, Mass., has taken out a permit for a one-story addition to cost $13,000.

The Vialle Motor Co., 15 Union Avenue, Framingham, Mass., has awarded a general contract to Thomas J. McMahon, 460 Concord Street, for a one-story service, repair and garage building, 60 x 130 ft., to cost $70,000 with equipment. E. R. Haberstroh, Kendall Hotel, is architect.

The B. Jahn Mfg. Co., New Britain, Conn., manufacturer of tools, dies, etc., has asked bids on a general contract for a two-story addition, 40 x 82 ft., to cost $25,000. Max J. Unkelbach, New Britain, is architect.

Philadelphia

PHILADELPHIA, Oct. 19.

TENTATIVE plans are under consideration by the Pennsylvania Railroad Co., Philadelphia, for a cold storage and refrigerating plant at its proposed produce yard and terminal buildings at South Philadelphia. It will approximate 75,000 sq. ft. of floor space and will cost close to $250,000 with machinery.

Bids have been taken by the Jacob Bloom Co., 1049 Frankford Avenue, Philadelphia, manufacturer of cedar chests and kindred products, for a new four-story wood-working plant addition, 30 x 100 ft., with extension, 21 x 50 ft., to cost $100,000 with machinery. William Lowenthal, 1208 Chestnut Street, is architect.

The Reading Railway Co., Reading Terminal, Philadelphia, is said to have plans for new car construction and repair shops at Reading, Pa., to cost close to $1,000,000 with machinery.

The Phoenix Portland Cement Co., Bankers' Trust Building, Philadelphia, has plans under way for an addition to its mill at Nazareth, Pa. T. J. Eggley, assistant secretary, is in charge.

Louis Reisman, Miller Building, 420 Spruce Street, Scranton, Pa., architect, has plans for a three-story automobile service, repair and garage building, 50 x 150 ft., to cost $85,000.

The Individual Drinking Cup Co., Easton, Pa., manufacturer of paper specialties, has awarded a general contract to the R. T. & C. D. Stewart Construction Co., Easton, for a new one-story plant, to cost $65,000 with equipment.

Fire, Oct. 15, destroyed a portion of the plant of the Colonial Slate Co., Wind Gap, Pa., with loss estimated at $50,000 including equipment. Plans for rebuilding are under consideration. Headquarters of the company are at Bangor, Pa.

The Board of Education, Marcus Hook, Pa., is planning the installation of manual training equipment in a local school. John S. Morrison is instructor in charge of manual training.

The Giant Portland Cement Co., Egypt, Pa., has plans for a group of new storage bins and other storage and distributing facilities at its mills, including mechanical conveying and handling equipment.

The Baldt Anchor, Chain & Forge Corporation, Chester, Pa., has been incorporated under Delaware laws, with capital of $100,000, to take over and operate the plant of the Baldt Anchor & Chain Co., recently acquired by the Boston Iron & Metal Co., Chester, the officials of which are understood to be active in the new organization. The new company proposes to operate a general foundry and machine shop, in addition to the production of iron and steel specialties.

The Hazzard Mfg. Co., 81 East Ross Street, Wilkes-Barre, Pa., manufacturer of wire rope, cable, etc., has awarded a general contract to the Curtis Co., 1 Hickory Street, for a three-story addition, 110 x 180 ft., to cost $200,000 with equipment.

The Wilkes-Barre School District, Wilkes-Barre, Pa., plans the installation of manual training equipment in its

The Crane Market

THE volume of new inquiry for both electric overhead and locomotive cranes is light, but pending lists of overhead equipment are sufficient to provide a fair degree of activity for the next few weeks. The half dozen overhead cranes for the General Electric Co. plants at Buffalo, West Philadelphia and Schenectady are still pending and no action has yet been taken on the large lists of cranes for the Anaconda Copper Mining Co., Andes Copper Mining Co. and Chile Exploration Co. Action is expected shortly on the three gantry cranes for the Delaware, Lackawanna & Western. The Hiler Engineering Co., Brooklyn, N. Y., is about to close on two 60-ft. span bucket cranes for a garbage disposal plant at Buffalo, N. Y.

In the Cleveland district the Willys-Overland Co., Toledo, Ohio, is in the market for a 7½-ton and two 5-ton electric traveling cranes.

Among recent purchases are:

Austin Co., Philadelphia, two 2½-cu. yd., 80-ft. span, 4-motor bucket handling cranes for the Summers Fertilizer Co., Baltimore, reported purchased from the Shepard Electric Crane & Hoist Co.

Edward G. Budd Mfg. Co., Philadelphia, a 15-ton, 60-ft. 10-in. span and a 5-ton, 27-ft. 9-in. span, 3-motor overhead cranes from the Niles-Bement-Pond Co.

Gulf Coast Lines, Houston, Tex., a 5-ton, 27-ft. 6-in. span electric crane from the Niles-Bement-Pond Co.

Mount Hope Finishing Co., Taunton, Mass., a 25-ton electric traveling crane from an unnamed builder.

Central Hudson Gas & Electric Co., Poughkeepsie, N. Y., a 35-ton electric traveling crane from an unnamed builder.

Dierks Lumber & Coal Co., Kansas City, Mo., a standard crawl-tread road building machine from the American Hoist & Derrick Co.

Thor-Duval Contracting Co., Philadelphia, a used 20-ton Browning locomotive crane from Philip T. King, 50 Church Street, New York.

Frazar & Co. 30 Church Street, New York, exporters, three 2-ton monorail hoists for Japan from the Shepard Electric Crane & Hoist Co.

Dodge Mfg. Co., Mishawaka, Ind., a 25-ton, 6-motor, overhead electric crane from the Harnischfeger Corporation.

proposed two-story and basement junior high school, to cost $250,000, for which bids will soon be asked. Robert Ireland, 81 North Washington Street, is architect.

Gehret Brothers, Bridgeport, Pa., operating a structural steel and iron works, have patented a new wire-weaving machine to handle the work of 20 men and will devote a portion of manufacture to the new equipment and parts.

The Board of Education, Gettysburg, Pa., is said to be planning the installation of manual training equipment in the new William B. Kurtz high school to cost $100,000, for which superstructure will begin at once.

The Keystone Equipment Co., P. O. Box 57, Easton, Pa., machinery dealer, has inquiries out for a tandem drum cableway hoisting engine, 10 x 12 in. or larger, Flory or similar type; also for a quantity of steel cable, 2½ or 2¼ in. diameter.

The Powell & Evans Log Hoisting Mfg. Co., Wilmington, Del., is interested in hearing from manufacturers having heavy machine tool equipment for the purpose of arranging for a part of its product to be made on a contract basis.

South Atlantic States

BALTIMORE, Oct. 19.

A PERMIT has been taken out by the Continental Roofing & Mfg. Co., 1200 South Sixteenth Street, Baltimore, for a two-story addition, 70 x 114 ft., to cost $20,000 exclusive of equipment.

The Cochrane Sales Co., 135 West North Avenue, Baltimore, automobiles, has awarded a general contract to W. F. Gischell & Co., Curtis Avenue, for a two-story service and repair building, 60 x 215 ft., to cost $80,000. Henry Massart, 328 North Charles Street, is architect.

Samuel T. Williams, 8 East Lexington Street, Baltimore, has inquiries out for a crusher to handle iron oxide ores, reducing to very small size, with capacity of about 10 tons per day.

The Everlastone Products Corporation, 119 North Collington Avenue, Baltimore, manufacturer of stucco and cast cement specialties, has purchased property at Belmont Avenue and Cemetary Lane as a site for a new plant.

The United States Engineer, Savannah, Ga., will receive bids until Nov. 12 for one 20-in. dredging pump shell, circular 92.

M. C. Winston, Warrenton, N. C., is organizing a company to establish a plant for the manufacture of commercial fertilizer. Machinery will be purchased soon, including a two-press mill, mixing apparatus, cottonseed oil machinery and auxiliary equipment.

The Board of Town Commissioners, Gatesville, N. C., is planning the installation of a municipal electric light and power plant.

The Tomlinson Chair Mfg. Co., High Point, N. C., has plans under way for an addition to cost $50,000 with equipment.

The General Purchasing Officer, Panama Canal, Washington, is asking bids until Nov. 4 for three air compressors, locomotive springs, brass tubing, copper tubing, 5000 lb. wire nails, 5000 lb. track bolts, machinists' taps, 1560 doz. hacksaw blades, bench vises, hand shovels, smoothing planes, wrenches, and other tools and equipment, Panama Circular 1703; until Oct. 31 for metal sashes, operating devices, louvres and doors, Panama Circular 1702.

The City Council, Hagerstown, Md., is asking bids until Nov. 15 for a water filtration plant for the municipal system on the Potomac River, near Williamsport. It is estimated to cost $1,500,000. George L. Bean, Abbott Building, Philadelphia, is consulting engineer.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, is said to be completing plans for the early erection of its proposed one-story steam-operated electric generating station at McComas and Gould Streets, with first unit to cost $3,000,000.

The Hackley Morrison Co., 1708 Lewis Street, Richmond, Va., machinery dealer, has inquiries out for a well-drilling machine, with tools, Star type; also, two portable fire box boilers, 50 and 30 hp., respectively, complete with fittings and accessories.

The Warwood Tool Co., Wheeling, W. Va., with plant at Warwood, W. Va., manufacturer of picks, mattocks and kindred tools, has acquired property at Baltimore for the establishment of a new plant.

The Bogue Supply Co., Bogue Park, Morehead City, N. C., has plans for a one-story factory, 42 x 125 ft., for the manufacture of concrete blocks and other cement products. The equipment installation will cost approximately $13,000. L. L. Mallard, Morehead City, is architect.

Pittsburgh

PITTSBURGH, Oct. 19.

MACHINE tool purchases are mostly for replacement and seldom include more than one or two items. On a money basis, October business has run ahead of the same period last month with some houses, due to the machines sold having been high-priced, but figured in numbers, there has not been much change either way as compared with September.

The plant of the Conemaugh Iron Works, Blairsville, Pa., destroyed by fire recently, will be rebuilt. A bond issue of $300,000 will be sold to help cover the cost and local business men have agreed to subscribe for half the issue.

The business of the Lakeside Forge Co., Erie, Pa., including the buildings, manufacturing equipment, patterns and tools for the manufacture of open end and adjustable wrenches, pliers, barrel spuds, eye bolts and general forgings, is to be sold in whole or in part by the Machine Tool Sales Co., Philadelphia, Pa.

Plans have been filed by the American Steel Band Co., 1400 Nixon Street, Pittsburgh, for a one-story addition.

The General Contracting Corporation, Columbia Building, Pittsburgh, has preliminary plans for a sand and gravel plant near the foot of Twentieth Street, East Liverpool, Ohio, vicinity of the Carroll-Porter Boiler Works, with screening, loading and other distributing machinery. It is reported to cost in excess of $75,000 with equipment. B. B. Byers is president.

The Board of Education, Fulton Building, Pittsburgh, plans the installation of manual training equipment in the

proposed Taylor Alldedice junior and senior high school to cost $2,400,000, for which a general contract has been let to the H. Miller & Sons Co., 2565 Fifth Avenue. Robert M. Trimble, Ferguson Building, is architect.

The Pittsburgh Garage Co., Pittsburgh, will erect a five-story service, repair and garage building to cost $175,000 with equipment.

The A. C. Love Co., Huntington, W. Va., is in the market for a 250-hp. water-tube boiler, to operate at about 175 lb. working pressure.

The Hudson Co., Martinsburg, W. Va., F. Vernon Aler, head, will build a new brick-manufacturing plant, with machine shop and power house, to cost $80,000 with equipment.

The Youngstown Sheet & Tube Co., Youngstown, Ohio, has plans for enlargements in its coal mining properties at Nemacolin, Pa., with the installation of additional power and mining machinery.

The Board of Education, Leetsdale, Pa., will install a manual training department in its proposed two-story and basement high school to cost $225,000, for which a general contract has been awarded to the R. B. McDanel Co., New Brighton, Pa. J. H. Phillips, Pittsburgh, is architect.

Cincinnati

CINCINNATI, Oct. 19.

A SUBSTANTIAL amount of business was placed with local machine tool manufacturers the past week. Although several large plants report a decrease in orders from automobile makers, activity in that field constituted a liberal proportion of the total volume of sales. While railroad inquiries are more numerous, buying is restricted principally to single machines. Textile machinery companies have purchased freely and general industrial business is improving gradually. The Willys-Overland Co. bought six crankshaft lathes from a local builder and the Franklin Motor Car Co. purchased four multi-cut lathes. A Lansing, Mich., manufacturer placed an order locally for six lathes.

It is the consensus of opinion among Cincinnati machine tool manufacturers that business is sufficiently active to warrant the continuance of production on the present heavy scale throughout the remainder of the year. Inquiries are numerous and if local builders convert only an average number into orders they will be able to sustain operations at the present satisfactory level. Machinery dealers are well pleased with the inflow of business. One company made more sales the first half of October than in any previous two weeks this year.

The Cincinnati Planer Co., which booked three Hypro motor-driven planers from the Textile Machinery Co., Reading, Pa., two weeks ago, received a duplicate order from this company and sold a 36-in. machine to the Studebaker Co. The Mobile & Ohio bought several engine lathes from a Cincinnati builder, while the John Steptoe Co. sold a milling machine to Dodge Brothers. The General American Tank Car Corporation, East Chicago, Ill., purchased a No. 3 axle lathe from the Niles-Bement-Pond Co. The Louisville & Nashville has not yet acted on its inquiry for lathes. It is reported that the Southern Railway is in the market for a lathe. A Detroit automobile manufacturer bought a number of drills from a Cincinnati builder. The Packard Motor Car Co. is the purchaser of six shapers, which are to be supplied by an Eastern machine tool manufacturer. A local turrete lathe company received orders from the oil fields from automobile concerns and from industrial companies.

The Shott Mfg. Co., 127 North Sears Street, Dayton, Ohio, has leased 10,000 sq. ft. in the east end of the Davis Sewing Machine plant.

The Valley Engineering Co., Dayton, Ohio, manufacturer of automatic refrigerating equipment, has taken a five-year lease on 11,000 sq. ft. in unit No. 4 of the former Davis Sewing Machine plant, adjoining. New equipment to treble the present output will be installed.

The Delco Light Co., Dayton, Ohio, has awarded a general contract to H. H. Rupe, Dayton, for a factory at Webster and Amelia Streets to cost $12,000. Schenck & Williams, Dayton, are the architects.

The Charles Schlear Motor Co., Cincinnati, is preparing plans for the erection of a garage and service station to cost $125,000 at Main and McPherson Streets, Dayton, Ohio. Joseph G. Steinkamp & Brother, 1212 Mercantile Library Building, Cincinnati, are the architects.

The National Screen & Mfg. Co., 1456 Harrison Avenue, Cincinnati, has purchased a five-story factory at Beekman Street and Ihorst Place from the Lunkenheimer Co. The company, which manufactures screens, radio cabinets and tables, will consolidate its several factories in the new plant. Frederick Bosken is president and general manager.

The Miami Fertilizer Co., Dayton, Ohio, recently incorporated, will convert a factory on the Xenia Pike, near Dayton, into a fertilizing plant. E. W. Wampler, Cincinnati, formerly associated with the Jarecki Chemical Co., Cincinnati, is president, and C. R. Martin, Dayton, secretary and sales manager.

Plans have been filed by the Bishopric Mfg. Co., Spring Grove Avenue, Cincinnati, manufacturer of wallboard products, for a one-story addition to cost $25,000. B. C. DeKamp, Gerke Building, is architect.

The Sabin Robbins Paper Co., Middletown, Ohio, has awarded a general contract to R. J. Stevens, First National Bank Building, for extensions in its mill at Crystal Springs and Ludlow Avenues, Cincinnati, to cost $50,000.

The Lack Mfg. Co., Paducah, Ky., has awarded a general contract to B. T. Davis, 1404 Jefferson Street, for a one-story plant for the manufacture of Davenport bed units. The installation will include metal-working equipment, punch presses, wood-working machinery, etc. F. S. Lack is secretary.

The Lilly White Oil Corporation, Springfield, Ohio, has plans for a one-story pumping plant at Columbus and Belmont Avenues. A new loading and distributing dock will also be constructed at this location.

Otto Darst, 186 East Broad Street, Columbus, Ohio, architect, has tentative plans for a new multi-story automobile service, repair and garage building with facilities for handling 500 cars, to cost $175,000.

Chicago

CHICAGO, Oct. 19.

THE first three weeks in October have shown no great change in the local machine tool market. Dealers in medium and light tools appear to be doing a better volume of business than those furnishing heavier equipment. In fact, the former anticipate that October buying and inquiry will slightly exceed either August or September. Reports are insistent that certain lines of tools have been, or shortly will be, advanced approximately 10 per cent in price. As one manufacturer puts it "the new price list which will go into effect at an early date will contain some changes but no reductions." The tools on which price stiffening is most apparent are grinders, automatic screw machines, multiple spindle drills, on-center grinders and milling machines.

The Illinois Steel Co. has virtually closed against its outstanding list, all items having been placed except a 5-ft. radial drill, according to the understanding of the trade. The Santa Fe has not yet closed on several machine tools included in its 1925 budget. Dealers are interested in the Florida East Coast list, which appears to be active. The Nash Motors Co. has about completed its tool buying for production expansion at its Kenosha plant and purchases now being made are for replacement. That company is still in the market, however, for additional tools for its Racine and Milwaukee plants. The General American Tank Car Corporation, Chicago, has bought an axle lathe from the Niles-Bement-Pond Co. The Remy Electric Division, General Electric Co., Anderson, Ind., has ordered a jig boring machine, two 16-in. lathes and one 13-in. lathe from the Pratt & Whitney Co. The International Harvester Co. is in the market for several machine tools. The Yellow Sleeve Valve Engine Works, East Moline, Ill., has purchased a turret lathe. Industries which appear to be most active are radio part manufacturers, builders of small electric motors, oil well equipment makers and forging plants.

The McClintic-Marshall Co., 38 South Dearborn Street, Chicago, will build a one-story, 100 x 200 ft., extension to its structural shop at 7769 Dante Avenue, Chicago, to cost $30,000.

The City Council, Venice, Ill., is arranging for the erection of a one-story pumping plant to cost approximately $200,000. Shephard & Morgan, Edwardsville, Ill., are engineers.

The Eagle Tank Co., 2450 North Crawford Avenue, Chicago, has purchased property at the corner of Kildare and

Wellington Streets, 297 x 209 ft., and will erect a one-story factory to cost $150,000.

The Flexible Traffic Control Co., 707 Globe Building, Minneapolis, Minn., maker of traffic control timers for the operation of street traffic signals, has recently been incorporated. The various parts of the timer are being manufactured under contract.

The Ingalls-Shepard Division, Wyman Gordon Co., Harvey, Ill., is planning an addition to its forge plant at 147th Street. It will be one story and cost $11,000.

Central Chicago Garages, Inc., 208 South La Salle Street, will build a ten-story public garage and service station at 13 East Kinzie Street, 85 x 150 ft., to cost $400,000. Dahl-Stedman Co., 11 South La Salle Street, is the general contractor.

The Wolff Range Boiler Mfg. Co., 2045 Fulton Avenue, Chicago, has purchased the former plant of the Brady Foundry Co., comprising about three and one-half acres, at the corner of Western Avenue and Forty-fifth Street, Chicago, for $287,500. The Wolff Mfg. Corporation, 255 North Hoyne Avenue, Chicago, was the seller. Alterations to the buildings are now under way.

The Frank Foundries Corporation, Davenport, Iowa, has leased additional floor space adjoining its plant in the building formerly occupied by the American Can Co.

The Marquette Cement Mfg. Co., 140 South Dearborn Street, Chicago, is said to have plans for a new mill at Gilmore City, Iowa, including power house and machine shop, to cost $1,000,000 with machinery.

The Mid-West Electric Co., Chicago, care of C. E. Frazier, 30 North Dearborn Street, architect, has plans for a one and two-story factory, 75 x 105 ft., for the manufacture of electrical specialties, to cost $30,000.

The Plibrico Jointless Fire Brick Co., 1135 Clay Street, Chicago, has awarded a general contract to E. W. Sproul & Co., 2001 West Pershing Road, for a new two-story and basement plant, 75 x 130 ft., to cost approximately $200,000 with equipment. Lockwood, Greene & Co., 400 North Michigan Avenue, are architects and engineers.

The Moore Mfg. Co., Waterloo, Iowa, manufacturer of heaters and sheet metal products, will rebuild the portion of its plant recently destroyed by fire, consisting of two one-story buildings, 50 x 100 ft. and 50 x 60 ft.

The Freidag Mfg. Co., 1131 South Adams Street, Freeport, Ill., manufacturer of iron, aluminum and other metal castings, has completed plans for a one-story foundry addition, 60 x 240 ft.

The Seeger Refrigerator Co., Wells Avenue and Arcade Street, St. Paul, Minn., will begin the erection of a one-story addition, 90 x 200 ft., for the manufacture of refrigerators and refrigerating machinery, to cost $85,000 with equipment.

John Green & Sons, Hoopeston, Ill., have broken ground on West Main Street for a new factory for the manufacture of re-babbitting machines.

The Abingdon Sanitary Mfg. Co., Abingdon, Ill., will construct a new factory at Denver, Colo. Property purchased is 700 x 700 ft., and the first unit, which will be 120 x 500 ft., will cost approximately $375,000.

Buffalo

BUFFALO, Oct. 19.

BIDS will be asked at once by the Houde Engineering Corporation, 1392 West Avenue, Buffalo, manufacturer of automobile equipment, for a one-story addition to cost $35,000. G. Morton Wolfe, 1377 Main Street, is architect.

The King Specialty Co., Buffalo, manufacturer of radio equipment, has leased the Thorpe Building, Courtright Street, Bridgeburg, Ont., for a branch plant and will soon begin operations.

Fire, Oct. 13, destroyed a portion of the plant of the General Glass Co., Geneva, N. Y., manufacturer of rolled and sheet glass products, with loss reported at $70,000. It is planned to rebuild.

The Pneumatic Scale Corporation, Norfolk Downs, Boston, has purchosed the plant and business of the Standard Automatic Machine Co., Rochester, N. Y. The new owner plans for the early removal of the equipment to its Norfolk Downs works, which will be extended. Production of standard machines and parts will be continued. Theodore E. Pennock, president and manager of the acquired company, will retire from the business, while Mahlon H. Gregg, heretofore secretary and treasurer, will continue with the new organization.

The Lamson Co., Syracuse, N. Y., manufacturer of conveyor systems and apparatus, is asking bids for a one-story addition to its works at Eastwood, Syracuse, 60 x 200 ft., to be equipped as a structural shop.

Refrigerating machinery, conveying and other equipment will be installed in the new plant to be erected by the Fairmont Creamery Co., 172 Michigan Avenue, Buffalo, to cost $200,000.

The Edward H. Baker Corporation, 1164 Main Street, Buffalo, automobile dealer, has awarded a general contract to the Metzger Construction Co., 676 Genesee Street, for a two-story service, repair and garage building, 90 x 120 ft., to cost $75,000. G. Morton Wolfe, 1377 Main Street, is architect.

The Pennsylvania Railroad has plans for a $100,000 addition to its locomotive repair shops at Olean, N. Y., for which considerable equipment will be purchased.

The Globe Woven Belting Co., 1396 Clinton Street, Buffalo, has filed plans for a one-story brick and steel addition, to cost $20,000 exclusive of equipment.

A manual training department will be installed in the new Monroe Avenue school at Brighton, N. Y., to cost $185,000, foundations for which are now being laid. Carl E. Lathrop, Cutler Building, Rochester, is architect.

The Vick & Hill Co., 97 St. Paul Street, Rochester, is in the market for a cast iron seven or eight section boiler, with auxiliary equipment.

Cleveland

CLEVELAND, Oct. 19.

THE Eaton Axle & Spring Co., Cleveland, made large purchases of machinery the past week, carrying out its previously announced expansion program in its axle manufacturing department. The total list includes 340 machines, a considerable portion of which were purchased during the week. The amount to be spent for equipment will aggregate $500,000, according to the company's estimates. A large part of the additional equipment will be standard production machinery, with special fixtures for drilling, milling, turning and other operations in the manufacture of axles.

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The Michigan Electric Railway Co., Lansing, Mich., will install a machine and repair shop at its new garage and service building, now in course of construction, for motor bus service. It will have a capacity for 50 buses and will cost $100,000.

The American Appliance Co., Inc., Kalamazoo, Mich., recently formed, will manufacture a line of electric door controls for automobile dealers, public garages, manufacturing plants, etc. Plans for production and distribution are not yet completed.

Gulf States

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The Birmingham Coal & Iron Co., 824 North Twenty-second Street, Birmingham, plans extensions in its coal-mining properties, to include the construction of a tripple and the installation of washers, screens and auxiliary equipment, to cost $90,000.

The Board of Education, Childress, Tex., is considering the installation of manual training equipment in its proposed two-story and basement high school, for which bids have been asked on general contract, estimated to cost $160,000. G. A. Carlander, Massie Building, Amarillo, Tex., is architect.

The American Ice Co., 4901 Cole Avenue, Dallas, Tex., is arranging for a one-story plant with capacity of close to 100 tons per day, to cost $50,000. It is also contemplating the construction of a similar plant at San Antonio, Tex., with daily output of about 60 tons. C. E. Kennemer is president.

In connection with an expansion and improvement program to cost about $5,000,000, the Lone Star Gas Co., Dallas, Tex., plans enlargements in its gas compressor stations at Ibex and Joshua, with extensions in its gasoline refinery at Gordon, Tex. About 143 miles of 18-in. pipe will be laid from the Caddo-Breckenridge district to Gordon and Joshua to Dallas and Fort Worth. The company has work in progress on a new compressor station in the Desdemona field.

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The Crane Co., 836 South Michigan Avenue, Chicago, has asked bids on a general contract for a four-story factory branch and distributing plant at Houston, Tex., to be 100 x 190 ft., with one-story extension, 61 x 80 ft., to cost close to $100,000 with equipment. A. C. Finn, Bankers' Mortgage Building, Houston, is architect.

Wellington Streets, 297 x 209 ft., and will erect a one-story factory to cost $150,000.

The Flexible Traffic Control Co., 707 Globe Building, Minneapolis, Minn., maker of traffic control timers for the operation of street traffic signals, has recently been incorporated. The various parts of the timer are being manufactured under contract.

The Ingalls-Shepard Division, Wyman Gordon Co., Harvey, Ill., is planning an addition to its forge plant at 147th Street. It will be one story and cost $11,000.

Central Chicago Garages, Inc., 208 South La Salle Street, will build a ten-story public garage and service station at 13 East Kinzie Street, 85 x 150 ft., to cost $400,000. Dahl-Stedman Co., 11 South La Salle Street, is the general contractor.

The Wolff Range Boiler Mfg. Co., 2045 Fulton Avenue, Chicago, has purchased the former plant of the Brady Foundry Co., comprising about three and one-half acres, at the corner of Western Avenue and Forty-fifth Street, Chicago, for $287,500. The Wolff Mfg. Corporation, 255 North Hoyne Avenue, Chicago, was the seller. Alterations to the buildings are now under way.

The Frank Foundries Corporation, Davenport, Iowa, has leased additional floor space adjoining its plant in the building formerly occupied by the American Can Co.

The Marquette Cement Mfg. Co., 140 South Dearborn Street, Chicago, is said to have plans for a new mill at Gilmore City, Iowa, including power house and machine shop, to cost $1,000,000 with machinery.

The Mid-West Electric Co., Chicago, care of C. E. Frazier, 30 North Dearborn Street, architect, has plans for a one and two-story factory, 75 x 105 ft., for the manufacture of electrical specialties, to cost $30,000.

The Plibrico Jointless Fire Brick Co., 1135 Clay Street, Chicago, has awarded a general contract to E. W. Sproul & Co., 2001 West Pershing Road, for a new two-story and basement plant, 75 x 130 ft., to cost approximately $200,000 with equipment. Lockwood, Greene & Co., 400 North Michigan Avenue, are architects and engineers.

The Moore Mfg. Co., Waterloo, Iowa, manufacturer of heaters and sheet metal products, will rebuild the portion of its plant recently destroyed by fire, consisting of two one-story buildings, 50 x 100 ft. and 50 x 60 ft.

The Freidag Mfg. Co., 1131 South Adams Street, Freeport, Ill., manufacturer of iron, aluminum and other metal castings, has completed plans for a one-story foundry addition, 60 x 240 ft.

The Seeger Refrigerator Co., Wells Avenue and Arcade Street, St. Paul, Minn., will begin the erection of a one-story addition, 90 x 200 ft., for the manufacture of refrigerators and refrigerating machinery, to cost $85,000 with equipment.

John Green & Sons, Hoopeston, Ill., have broken ground on West Main Street for a new factory for the manufacture of re-babbitting machines.

The Abingdon Sanitary Mfg. Co., Abingdon, Ill., will construct a new factory at Denver, Colo. Property purchased is 700 x 700 ft., and the first unit, which will be 120 x 500 ft., will cost approximately $375,000.

Buffalo

BUFFALO, Oct. 19.

BIDS will be asked at once by the Houde Engineering Corporation, 1392 West Avenue, Buffalo, manufacturer of automobile equipment, for a one-story addition to cost $35,000. G. Morton Wolfe, 1377 Main Street, is architect.

The King Specialty Co., Buffalo, manufacturer of radio equipment, has leased the Thorpe Building, Courtright Street, Bridgeburg, Ont., for a branch plant and will soon begin operations.

Fire, Oct. 13, destroyed a portion of the plant of the General Glass Co., Geneva, N. Y., manufacturer of rolled and sheet glass products, with loss reported at $70,000. It is planned to rebuild.

The Pneumatic Scale Corporation, Norfolk Downs, Boston, has purchosed the plant and business of the Standard Automatic Machine Co., Rochester, N. Y. The new owner plans for the early removal of the equipment to its Norfolk Downs works, which will be extended. Production of standard machines and parts will be continued. Theodore E. Pennock, president and manager of the acquired company, will retire from the business, while Mahlon H. Gregg, heretofore secretary and treasurer, will continue with the new organization.

The Lamson Co., Syracuse, N. Y., manufacturer of conveyor systems and apparatus, is asking bids for a one-story addition to its works at Eastwood, Syracuse, 60 x 200 ft., to be equipped as a structural shop.

Refrigerating machinery, conveying and other equipment will be installed in the new plant to be erected by the Fairmont Creamery Co., 172 Michigan Avenue, Buffalo, to cost $200,000.

The Edward H. Baker Corporation, 1164 Main Street, Buffalo, automobile dealer, has awarded a general contract to the Metzger Construction Co., 676 Genesee Street, for a two-story service, repair and garage building, 90 x 120 ft., to cost $75,000. G. Morton Wolfe, 1377 Main Street, is architect.

The Pennsylvania Railroad has plans for a $100,000 addition to its locomotive repair shops at Olean, N. Y., for which considerable equipment will be purchased.

The Globe Woven Belting Co., 1396 Clinton Street, Buffalo, has filed plans for a one-story brick and steel addition, to cost $20,000 exclusive of equipment.

A manual training department will be installed in the new Monroe Avenue school at Brighton, N. Y., to cost $185,000, foundations for which are now being laid. Carl E. Lathrop, Cutler Building, Rochester, is architect.

The Vick & Hill Co., 97 St. Paul Street, Rochester, is in the market for a cast iron seven or eight section boiler, with auxiliary equipment.

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The Common Council, Gainesville, Fla., is asking bids until Oct. 28 for one 450 hp. boiler. G. H. Cairns is city manager.

The Equitable Equipment Co., New Orleans, has inquiries out for a low pressure turbo-generator set, 250 to 500 kw. capacity, three-phase, 60 cycle, 220 volts.

George T. Bishop, Inc., Market and Crockett Streets, Shreveport, La., is planning the construction of a five-story automobile service, repair and garage building to cost $170,000 with equipment.

The Independent Ice Co., 115 North Lawrence Street, Montgomery, Ala., is arranging for the erection of a two-story plant, 125 x 150 ft., to cost about $180,000 with equipment, electrically-operated in all departments. J. W. Hunter is secretary.

The City Commission, Fort Lauderdale, Fla., is planning the early installation of equipment for the municipal waterworks, including two motor-driven centrifugal pumps, each with capacity of 1000 gal. per min.; two motor-driven air compressors and accessory apparatus. Later it is proposed to purchase a triplex pumping unit, with engine and other machinery, to cost about $25,000.

Indiana

INDIANAPOLIS, Oct. 19.

PLANS are being considered by the Richmond Fireproofing Co., Richmond, Ind., manufacturer of metal doors, sash, etc., for an addition to cost about $50,000 with equipment. W. B. Hewitt is general manager.

The Standard Oil Co. of Indiana, 802 Lord Street, Indianapolis, has plans for a three-story storage and distributing plant, 50 x 100 ft., and smaller one-story buildings, to cost approximately $80,000.

The City Council, Rushville, Ind., has plans for extensions and improvements in the municipal electric light and power house, to include the installation of a new generator unit, condensers and other machinery. Charles Brossman, Merchants' Bank Building, Indianapolis, is engineer.

The Indianapolis Plating Co., 635 Kentucky Avenue, Indianapolis, has plans for a new one-story factory at 425 West Vermont Street, to cost approximately $45,000, of which about $25,000 will be expended for machinery. It is proposed to remove the present works to the new location.

Refrigerating machinery, mechanical handling and other equipment will be installed in the new two-story and basement plant, 120 x 165 ft., to be erected by the Clover Leaf Dairy Co., Gary, Ind., to cost $110,000. R. Griesser, 64 West Randolph Street, Chicago, is architect.

The Ohio Valley Roofing Co., Evansville, Ind., has plans for a two-story and basement storage and distributing plant, with shop facilities, 105 x 156 ft., to cost $75,000. S. J. Becker is secretary.

The Stant Machine Co., Connersville, Ind., has plans under way for a one-story works, 41 x 92 ft., for the manufacture of automotive equipment, to cost $17,000. Ivan Stant is president.

The Defiance Automatic Screw Co., Fort Wayne, Ind., has purchased property adjoining the Wabash Railroad and will erect buildings which will triple the capacity of the present factory.

Pacific Coast

SAN FRANCISCO, Oct. 14.

PROPERTY at Oakland, Cal., totaling about 3½ acres, has been purchased by the Mohawk Oil Co., 311 California Street, San Francisco, as a site for a new storage and distributing plant, to cost close to $250,000 with machinery.

The Crane Co., 836 South Michigan Avenue, Chicago, has plans under way for a one-story and basement factory branch and distributing plant at Phoenix, Ariz., 140 x 200 ft., to cost $85,000. Fitzhugh & Byron, Home Builders' Building, Phoenix, are architects.

The St. Helens Pulp & Paper Co., St. Helens, Ore., will begin the construction of a new mill, to cost approximately $1,200,000 with machinery. A machine shop will be installed. Willard P. Hawley, Jr., head of the Hawley Pulp & Paper Co., Oregon City, Ore., is vice-president, in charge.

The Pacific Coast Steel Co., Seattle, has plans for a one-story addition at 4001 Twenty-eighth Avenue, to cost $23,000.

The Northwestern Sugar Refining Co., Bank of Italy Building, Oakland, Cal., has authorized plans for a new beet sugar refinery at Napa, Cal. A power plant and machine shop will be installed. The entire project will cost $1,000,000. Fred Hinze is president and general manager.

The California Steel Products Co., 452 Bay Street, San Francisco, recently organized with a capital of $100,000 has acquired a 4-acre tract in the vicinity of Sixty-sixth Street, Oakland, Cal., and contemplates the early construction of a new plant. The company is headed by W. E. Kettering and E. P. McCann.

The Bakersfield Rock & Gravel Co., Bakersfield, Cal., will soon begin the construction of a new plant in this vicinity, with departments for rock-crushing, gravel-screening, loading and distributing, etc., to cost $100,000 with machinery. Fred C. Macomber, Taft, Cal., is president, and J. B. Dowd, vice-president.

The City Council, Ellensburg, Wash., has approved plans for proposed extensions and improvements in the municipal electric light and power plant, with the installation of additional machinery. The work is estimated to cost $250,000. Bids will soon be asked for equipment. Baar & Cunningham, Spaulding Building, Portland, Ore., are engineers.

The Crockett Union High School District, Crockett, Cal., plans the installation of manual training equipment in a proposed two-story high school, to cost $400,000, for which bids will soon be asked on a general contract. A. A. Brown, 215 Market Street, San Francisco, is architect.

Construction has started on an addition to the plant of Gaffers & Sattler, manufacturers of gas ranges, in the central manufacturing district of Los Angeles, which will double the capacity and provide a total floor space of 27,600 sq. ft.

Plans are being completed for a 10-story building for the Frank Wiggins trade school on Sixteenth Street, Los Angeles, to cost $700,000. John C. Austin and Frederic M. Ashley are the architects.

A one-story carpenter and machine shop is included in plans for a group of high school buildings to be erected for the Brawley Union High School District, Brawley, Cal. G. Stanley Wilson, Riverside, is architect.

Milwaukee

MILWAUKEE, Oct. 19.

THE addition of 823 men to the payrolls of representative Milwaukee industries, principally foundries and machine shops, in the past month, and a growing scarcity of skilled labor for such employment, furnish much encouragement to the local machine-tool trade. The steady maintenance of inquiry and a slowly rising sales-curve are also regarded with much satisfaction. While the automotive industries are still the best customers as a group, renewed interest is discernible among manufacturers of electrical generating machinery, oil field equipment, and other heavy machinery.

The Federal Pressed Steel Co., Milwaukee, has plans for an addition to its shop, to cost about $20,000 with new equipment now being acquired. The principal product is automobile bumpers, although a varied line of steel stampings is manufactured. The main works are at Keefe Avenue and North Pierce Street.

The Hannum Mfg. Co., successor to the Lavine Gear Co., 60-80 Keefe Avenue, Milwaukee, is completing purchases of additional tool room equipment and then will make some replacements and additions to the production equipment. It manufactures steering gears adapted to balloon tires, which embraces considerable change from the former line of ordinary automobile steering gears. George H. Hannum is president, and T. Ray Johnson, vice-president and chief engineer.

The United States Engineer Office, Government Building, Milwaukee, is requesting tenders until Nov. 16 for the construction and complete equipment of a 15-ton steel derrick vessel for harbor construction in this district.

The Common Council, Neenah, Wis., will close bids Oct. 23 for the construction of a municipal tool house, machine and service shop and garage, 50 x 100 ft., estimated to cost $32,000 with equipment. Plans are by McMahon & Clark, consulting engineers, Menasha, Wis. H. S. Zemlock is city clerk.

The Wisconsin Ice & Coal Co., 320 East North Avenue, Milwaukee, will establish two additional artificial ice production, storage and distribution units costing $30,000 each, and is in the market for two 15-ton ice machine units complete. William F. Schepka is vice-president and general manager.

M. J. Vanderhoff, Sixth and Central Streets, Marshfield, Wis., let the general contract to Frank Felhoefer, local, for

a brick and steel addition, 40 x 100 ft., to his machine shop and automotive service and repair shop. With equipment the investment will be about $30,000.

Canada

TORONTO, Oct. 19.

IMPROVED conditions in industrial activities of Canada have had a stimulating effect on machine tool demand. Manufacturers are showing more interest in plant equipment and are replacing obsolete and worn out tools with those of modern design. Requirements are of a diversified nature with practically all classes of tools being taken. Orders from automobile manufacturers fell off during the week, but a strong demand was reported for repair shops and a number of inquiries appeared for service stations in various parts of Ontario and Quebec.

The Aluminum Co. of Canada will install ten of the largest turbines in the world at Chipsaw, near Chute a Caron, Que., where its new plants are under construction. The total cost of the generators will be approximately $11,000,000. The Dominion Engineering Co., a subsidiary of the Dominion Bridge Co., has put in a tender for the business. Many other contracts of interest to Canadian firms still have to be arranged for.

The International Paper Co., Three Rivers, Que., proposes to start work soon on a large newsprint mill on the Gatineau River in Quebec Province. The plant will have an initial capacity of 400 tons of newsprint per day and will be modeled along the lines of the Three Rivers mill.

Fire which started in the engine room of the Bishopric Mfg. Co., Ottawa, Ont., caused damage estimated at $50,000 to the plant and machinery. Repairs will be made immediately and some additional equipment will be required.

The Canadian National Railway's roundhouse at Oxford Junction, N. S., was destroyed by fire with a loss of $80,000. It will be rebuilt.

The Hamilton Bridge Co., Ltd., N. Hamilton, Ont., has the steel contract for a factory addition on Hall's Lane, Kitchener, Ont., for Schreiters, Ltd., King Street W., Kitchener, Ont.

The Dominion Square Garage, Montreal, has started preliminary work in connection with the erection of a $300,000 garage. Equipment and tools have still to be purchased.

The Dominion Bedstead Co., Ltd., 300 Atlantic Avenue, Montreal, will build a manufacturing plant. J. H. Noel, 339 Bleury Street, is architect and is receiving tenders.

Bids will be received by S. H. Kent, city clerk, Hamilton, Ont., until Nov. 16 for sewage pumps, pipe and valves for the Gage Avenue station.

Trade Changes

The American Engineering Co., Philadelphia, announces the following recently appointed representatives for the sale of its "Lo-Hed" hoist: All-Steel Equipment Co., Albany, N. Y.; American Machinery & Supply Co., Omaha, Neb.; Ambler & Riter, Salt Lake City, Utah; Dravo-Doyle Co., Cleveland and Indianapolis; Factory Supply Co., Inc., Birmingham; C. Fuson Co., Memphis, Tenn.; Gibbens & Gorden, Inc., New Orleans; Industrial Products Corporation, Pittsburgh; Menner & Kimball, St. Louis, Mo.; Standard Steel & Supply Co., Ashland, Ky.; C. Turner & Co., Chattanooga, Tenn.; S. R. Vanderbeck, Philadelphia; Wylie Brothers, Oklahoma City, Okla. A representative of the "Lo-Hed" hoist department also has been added to the staff of the American Engineering Co.'s Chicago office.

William Leard Co., Inc., New Brighton, Pa., has appointed George H. Cameron sales representative for New England, with office at Room 88, 683 Atlantic Avenue, Boston.

The Kloster Steel Corporation has established an office and warehouse at 1036 West Lake Street, Chicago. Einar Lindeblad who has been engaged in importing steel for many years in the United States and Canada, has been elected president and C. A. Palmgren, vice-president. The corporation is direct representative of the Kloster Steel and Iron Works, Langshyttan and Stjernsund, Sweden. Stocks of tool steel, hollow drill-steel and Swedish iron will be maintained in Chicago to supplement direct importations from Sweden.

The Wagner Electric Corporation, St. Louis, has appointed A. H. Ellerman to the staff of its Kansas City, Mo., office.

The Lake Erie Bolt & Nut Co., Cleveland, has appointed M. Fuhrer, 447 Greenwich Street, New York, as its sales representative in that city.

Foote Brothers Gear & Machine Co., Chicago, has appointed George Roberts as representative for Detroit and environs. His headquarters will be at 576 Montclair Street, Detroit.

The name of the Coast Culvert & Flume Co., Portland, Ore., has been changed to the Beall Tank & Pipe Co.

The C. F. Bulotti Machinery Co. has moved from 67-71 Main street to 829-831 Folsom Street, San Francisco, because of the necessity of securing larger quarters. The address given in the Oct. 1 issue was incorrect because of a typographical error.

The Weir Frog Co., Cincinnati, and the Kilby Frog & Switch Co., Birmingham, have consolidated and hereafter will be known as the Weir Kilby Corporation, with sales offices and plants at Cincinnati and Birmingham. O. DeG. Vanderbilt, Jr., is president; E. M. Kilby, first vice-president, and J. K. Lansdowne, vice-president.

The Tool Equipment Sales Co., 18 S. Clinton Street, Chicago, C. B. Cole, president, has been appointed the exclusive factory representatives of the New Process Twist Drill Co. of Taunton, Mass., for the Chicago territory. The Tool Equipment Sales Co., has a complete stock of carbon and high-speed drills at Chicago.

Industrial Finance Notes

The Youngstown Sheet & Tube Co., Youngstown, will publish between Oct. 20 and 25 its third-quarter financial statement. Net earnings are estimated at $3 per share of common stock, comparing with $3.48 the first quarter and $3.22 the second quarter of this year. Improved earnings from September operations enable the company to make a better showing than was thought possible a month ago.

The management of the Trumbull Steel Co., Warren, Ohio, will issue early in November a statement of earnings from October operations, based upon a more efficient cost system now being installed. It is expected this statement will have a bearing on the decision with respect to the entrance of the company into a consolidation or its continuance as an independent interest. Prior to his resignation as president Jonathan Warner had entered into negotiations with the Midland Steel Products Co. and the Otis Steel Co., both of Cleveland, for an amalgamation.

Distribution of $2,006.76, the balance remaining after the settlement of all debts of the Barney & Smith Car Co., Dayton, Ohio, has been ordered by the Common Pleas Court of that city.

Stockholders of the Aluminum Co. of America have approved a reduction in the par value of the common stock from $5 a share to no par and authorized directors to issue 27,375 shares now held in the company's treasury, making the total number of shares outstanding 1,500,000.

The financial statement of the Falcon Steel Co., Niles, Ohio, shows a net loss of $58,660 after preferred dividends for the last fiscal year had been paid. Net profits for the year were $11,339 but dividends on 7 per cent preferred stock call for $70,000 so that the balance on June 30, 1925, is only $145,465 as against $204,125 a year previous.

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Current Metal Prices

On Small Lots, Delivered from Stocks, New York

THESE prices are given for the convenience of small-lot buyers whose requirements do not run into mill-size orders.

Only base prices can be listed in some cases, due to limits of space; other items of a given group are deducible from the base price.

The prices which are quoted below are those at which small lots may be bought, whether from jobbers' or other stocks.

Complete market reports and prices on large shipments from mills will be found elsewhere under "Iron and Steel Markets" and "Non-Ferrous Metals."

Bars, Shapes and Plates

	Per Lb.
Bars:	
Refined iron bars, base price	3.24c.
Swedish charcoal iron bars, base	7.00c. to 7.25c.
Soft steel bars, base price	3.24c.
Hoops, base price	4.49c.
Bands, base price	3.99c.
Beams and channels, angles and tees, 3 in. x ¼ in. and larger, base	3.34c.
Channels, angles and tees under 3 in. x ¼ in. base	3.24c.
Steel plates, ¼ in. and heavier	3.34c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.30c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.65c.
Toe-calk, ½ x ⅝ in. and larger	4.20c.
Cold-rolled strip, soft and quarter hard	7.00c.
Open-hearth spring steel	4.50c. to 7.00c.
Shafting and Screw Stock:	
Rounds and hex	4.00c.
Squares and flats	4.50c.
Standard tool steel, base price	15.00c.
Extra tool steel	18.00c.
Special tool steel	23.00c.
High-speed steel, 18 per cent tungsten	70c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.89c.
No. 12	3.94c.
No. 14	3.99c.
No. 16	4.09c.

Box Annealed—Black

	Soft Steel C. R. One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	3.80c. to 3.95c.	.....
Nos. 22 and 24	3.85c. to 4.20c.	4.35c.
No. 26	3.90c. to 4.25c.	4.40c.
No. 28*	4.00c. to 4.35c.	4.50c.
No. 30	4.20c. to 4.55c.	.....

Galvanized

	Per Lb.
No. 14	4.10c. to 4.45c.
No. 16	4.25c. to 4.60c.
Nos. 18 and 20	4.40c. to 4.75c.
Nos. 22 and 24	4.55c. to 4.90c.
No. 26	4.60c. to 5.05c.
No. 28*	5.00c. to 5.35c.
No. 30	5.50c. to 5.85c.

No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt	46	29	⅛ in. Butt	4	+19
¾ in. Butt	51	37	¼ in. Butt	11	+ 9
1-3 in. Butt	53	39	1-1½ in. Butt	14	+ 6
2½-6 in. Lap	48	35	2-in. Lap	5	+14
7 & 8 in. Lap	44	17	3-6 in. Lap	11	+ 6
11 & 12 in. Lap	37	12	7-12 in. Lap	3	+16

Bolts and Screws

Machine bolts, cut thread, 40 and 10 per cent off list
Carriage bolts, cut thread, 30 and 10 per cent off list
Coach screws, 40 and 10 per cent off list
Wood screws, flat head iron,
80, 20, 10 and 5 per cent off list

Steel Wire

Base Price† on No. 9 Gage and Coarser	Per Lb.
Bright, basic	4.10c. to 4.25c.
Annealed, soft	4.35c. to 4.50c.
Galvanized, annealed	5.00c. to 5.15c.
Coppered, basic	5.00c. to 5.15c.
Tinned, soft Bessemer	6.00c. to 6.15c.

†Regular extras for lighter gage.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	19⅛c. to 20⅛c.
High brass wire	19⅝c. to 20⅝c.
Brass rods	16⅞c. to 17⅞c.
Brass tube, brazed	27⅛c. to 28⅛c.
Brass tube, seamless	23¾c. to 24¾c.
Copper tube, seamless	24¾c. to 25¾c.

Copper Sheets

Sheet copper, hot rolled, 21¾c. to 22¾c. per lb. base.
Cold rolled, 14 oz. and heavier, 3c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14x20	Prime	Seconds
		80 lb.	$6.15	$5.90
		90 lb.	6.30	6.05
		100 lb.	6.45	6.20
IC	$11.25	IC	6.65	6.40
IX	12.85	IX	7.85	7.60
IXX	14.40	IXX	9.00	8.75
IXXX	15.75	IXXX	10.35	10.10
IXXXX	17.00	IXXXX	11.35	11.10

Terne Plates

8 lb. coating, 14 x 20

100 lb.	$7.00 to $8.00
IC	7.25 to 8.25
IX	8.25 to 8.75
Fire-door stock	9.00 to 10.00

Tin

Straits, pig	65c.
Bar	68c. to 70c.

Copper

Lake ingot	16¾c.
Electrolytic	16½c.
Casting	16 c.

Spelter and Sheet Zinc

Western spelter	10c.
Sheet zinc, No. 9 base, casks	12½c.; open, 13c.

Lead and Solder*

American pig lead	10½c. to 12½c.
Bar lead	12½c. to 13½c.
Solder, ½ and ½ guaranteed	40c.
No. 1 solder	37c.
Refined Solder	30½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	75c. to 90c.
Commercial grade, per lb.	35c. to 50c.
Grade D, per lb.	25c. to 35c.

Antimony

Asiatic	20c. to 21c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), ingots for remelting, per lb.	30c. to 31c.

Old Metals

Business is fair and values practically unchanged. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy crucible	12.00
Copper, heavy wire	11.75
Copper, light bottoms	9.50
Brass, heavy	7.25
Brass, light	6.00
Heavy machine composition	9.00
No. 1 yellow brass turnings	8.50
No. 1 red brass or composition turnings	8.25
Lead, heavy	7.75
Lead, tea	6.25
Zinc	4.75
Cast aluminum	18.50
Sheet aluminum	18.50